

Wireless Semiconductor Products

System Application Block Diagrams and Product Suggestions

Selection Guide



Accelerating Progress in Wireless Communications

Mobile communications are changing the way industries and individuals manage their lives, homes, offices and businesses. Avago Technologies is at the forefront of the wireless revolution, offering a broad range of mobile connectivity and wireless solutions, and is the partner of choice for leading wireless manufacturers and service providers around the globe. Avago products add value to every stage in the wireless production cycle.



Avago Technologies' tiny RFICs have helped lead to smaller wireless products with increased battery life.

RF Component Solutions

Avago Technologies RF component innovations have been instrumental in driving the wireless revolution. Avago CoolPAM™ power amplifiers, Film Bulk Acoustic Resonator (FBAR) filters, and Enhancement-mode pHEMT low noise amplifiers have set new benchmarks for performance, size and battery life. Avago products combine innovative technology, three decades of microwave and RF design experience, and expertise in system, protocol and regulatory understanding to create solutions that can help customers meet the most demanding technical specifications and the most difficult regulatory tests around the world.

Manufacturing Technologies

- Film Bulk Acoustic Resonator
- Gallium Arsenide Heterojunction Bipolar Transistor
- Pseudomorphic High Electron Mobility Transistor
- Enhancement Mode Pseudomorphic High Electron Mobility Transistor
- Silicon

Product Offerings

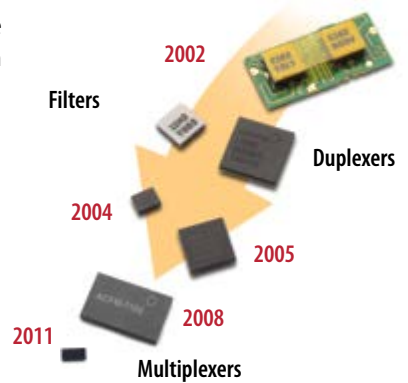
- Filters, Duplexers, and Multiplexers
- Power Amplifier Modules for many standards, including GSM, CDMA, W-CDMA, TD-SCDMA, and LTE
- Low Noise Amplifiers
- Front End Modules including Power Amplifier – Duplexers and Filter-LNAs
- RFICs
- Schottky and PIN Diodes
- Field Effect and Bipolar Transistors
- Millimeter Wave MMICs



Film Bulk Acoustic Resonator (FBAR) Filters, Duplexers, Multiplexers and GPS Front-end Modules

Today's smartphones face many challenges, including support for difficult LTE frequency bands and the need for coexistence between multiple radio systems. The exceptional performance of Avago FBAR filtering technology helps designers meet these challenges by providing low loss filtering with steep rejection characteristics. Microcap wafer-to-wafer bonding technology enables flexible, miniature packaging, including true chip-scale WaferCap filters. FBAR filters are also combined with EpHEMT LNAs to create a line of high performance modules that support demanding GPS and GLONASS applications.

Avago Technologies created a new filter technology with FBAR that helps designers solve tough filtering problems.



Features

- Steep roll-off
- Low insertion loss
- High Isolation
- Superior Out-of-Band Rejection
- Excellent power handling
- Low temperature coefficient

Benefits

- Supports more efficient use of spectrum
- Extends battery life
- Supports coexistence of simultaneously operating radio systems
- Meets stringent 2nd Harmonic LTE requirements
- Improves phones sensitivity, enhancing data rate and network performance
- Can support multiple standards

FBAR Duplexer

UMTS Band 1	UMTS Band 2 / CDMA PCS	UMTS/LTE Band 3	LTE/UMTS Band 4/CDMA AWS-1	LTE Band 7	LTE B25/BC14	UMTS Band 8
ACMD-7614 ACMD-7617	ACMD-4102, ACMD-4502, ACMD-6102, ACMD-7407, ACMD-7409, ACMD-7410, ACMD-7411	ACMD-6003, ACMD-6103	ACMD-4104, ACMD-7609	ACMD-6007 ACMD-6207 ACMD-6307	ACMD-4202 ACMD-6025 ACMD-6125	ACMD-7606 ACMD-7610

FBAR Multiplexer

Part No.	Standard	Package Size
ACFM-7109	CDMA PCS & Cellular Quadplexer	3.0x5.0x1.05 mm
ACFM-7110	CDMA PCS & Cellular Quadplexer	3.0x5.0x1.05 mm
ACFM-7107	CDMA PCS & Cellular Quadplexer	4.0x7.0x1.2 mm
ACFM-7325	Extended PCS & Cellular (BC10/BC14) Quadplexer	4.0x7.0x1.2 mm
ACFM-7425	PCS & Extended Cellular (BC10/B25) Quadplexer	4.0x7.0x1.2 mm

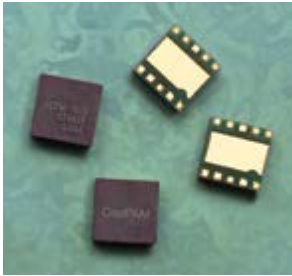
FBAR Filters

Part No.	Standard	Passband	Package Size
ACPF-7005	CDMA PCS+BC14/B25	1850-1915 MHz	1.6 x 2.0 x 1.1mm
ACPF-7024	ISM/WLAN/BT	2401-2482 MHz	1.6 x 2.0 x 0.95 mm
ACPF-7025	B41	2496-2690 MHz	2.5 x 2.5 x 1.0 mm
ACPF-7041	LTE B41	2496-2690 MHz	2.0 x 2.0 x 0.9 mm
ACPF-7124	ISM/WLAN/BT	2401-2482 MHz	1.1 x 1.4 x 0.8 mm
ACPF-7224	ISM/WLAN/BT	2401-2482 MHz	1.1 x 1.4 x 0.8 mm
ACPF-7324	ISM/WLAN/BT	2401-2482 MHz	0.66 x 0.92 x 0.25 mm
ACPF-8025/8125	LTE B25 Rx Diversity	1930-1995 MHz	1.1 x 1.4 x 0.8 mm
ACPF-8040	LTE B40	2300-2400 MHz	2.0 x 1.6 x 0.95 mm
ACPF-9002	WLAN	2403-2493 MHz	0.6 x 0.81 x 0.25 mm
ACFF-1024	WiFi	2401-2482 MHz	1.1 x 1.4 x 0.8 mm

GNSS Front-End-Modules

Part No.	Passband	Configuration	Package Size
AGPS-C003 (GPS, GLONASS+Cellular)	1565-1606 MHz	Diplexer	2.0x2.0x0.95 mm
ALM-GN001 (GPS, GLONASS)	1565-1606 MHz	Filter-LNA	2.3x1.7x0.9 mm
ALM-2712 (GPS)	1574.42-1576.42 MHz	Filter-LNA-Filter	3.0x2.5x1.0 mm
ALM-1712 (GPS)	1574.42-1576.42 MHz	Filter-LNA-Filter	4.5x2.2x1.1 mm
ALM-1812 (GPS)	1574.42-1576.42 MHz	Filter-LNA-Filter	4.5x2.2x1.1 mm
ALM-1612 (GPS)	1574.42-1576.42 MHz	LNA-Filter	3.3x2.1x1.0 mm
ALM-2412 (GPS)	1574.42-1576.42 MHz	LNA-Filter	3.3x2.1x1.1 mm

Power Amplifier Modules and PA-Duplexer Front End Modules



Avago Technologies CoolPAM and FEM technologies offer superior performance.

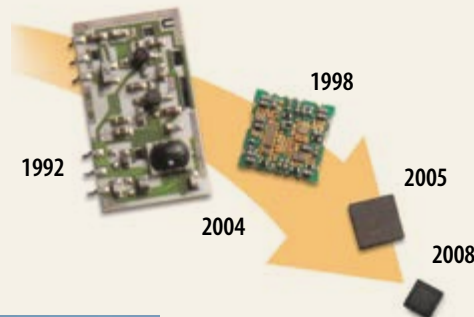
Battery life is one of the most important issues facing designers of next-generation mobile handsets. Not only is it inconvenient to frequently recharge the battery, but lower power consumption in the power amplifier frees more energy for other features like large displays. Avago has developed a technology called CoolPAM™ that helps to optimize battery life by only turning on as much of the power amplifier as is needed, thus greatly enhancing efficiency. Avago has over 15 years of design and manufacturing expertise in power products, and offers power amplifier modules for many different applications. Additionally, Avago has combined its industry-leading FBAR and CoolPAM. technologies to offer a range of integrated modules. By combine multiple “best in class” technologies and optimizing partitioning and device interfaces, these devices can provide superior electrical performance, allowing designers get their products to market faster, with less risk and higher yields.

Features

- High Efficiency
- Integrated high directivity coupling
- Support for multiple standards, including CDMA, W-CDMA, GSM/EDGE, LTE, and TD-SCDMA
- Support for most major bands in a common footprint

Benefits

- Extends battery life
- Excellent power control
- Supports complex 3G and 4G architectures
- Can support multiple standards



Avago Technologies has more than 15 years of design and manufacturing expertise in power products resulting in smaller size and higher efficiency.



Power Amplifiers

Classification	Part No.	Bands	Control	Signal	Package Size	C: CDMA U: UMTS L: LTE T: TD-SCDMA
Single Band PA	ACPM-9013	B13	GPIO	APT	2 x 2.5mm	L
	ACPM-9017	B17	GPIO	APT	2 x 2.5mm	L
	ACPM-9020	B20	GPIO	APT	2 x 2.5mm	L
	ACPM-9040	B40	GPIO	APT	2 x 2.5mm	L
	ACPM-9041	B41	GPIO	APT	2 x 2.5mm	L
	ACPM-9307	B7	MIPI	APT	2 x 2.5mm	L
	ACPM-9311	B11	MIPI	APT	2 x 2.5mm	L
	ACPM-9313	B13	MIPI	APT	2 x 2.5mm	L
	ACPM-9317	B17	MIPI	APT	2 x 2.5mm	L
	ACPM-9320	B20	MIPI	APT	2 x 2.5mm	L
	ACPM-9328	B28	MIPI	APT	2 x 2.5mm	L
	ACPM-9330	B30	MIPI	APT	2 x 2.5mm	L
	ACPM-9340	B40	MIPI	APT	2 x 2.5mm	L
	ACPM-9341	B41	MIPI	APT	2 x 2.5mm	L
	ACPM-9407	B7	MIPI	ET	2 x 2.5mm	L
	ACPM-9411	B11	MIPI	ET	2 x 2.5mm	L
	ACPM-9412	B12	MIPI	ET	2 x 2.5mm	L
	ACPM-9413	B13	MIPI	ET/APT	2 x 2.5mm	L
	ACPM-9417	B17	MIPI	ET	2 x 2.5mm	L
	ACPM-9420	B20	MIPI	ET	2 x 2.5mm	L
ACPM-9428	B28	MIPI	ET	2 x 2.5mm	L	
ACPM-9430	B30	MIPI	ET	2 x 2.5mm	L	
Dual band PA	ACPM-9081	B1/B8 (SiDo)	GPIO	APT	3 x 4mm	C/U
	ACPM-9052	B2/B5 (SiDo)	GPIO	APT	3 x 4mm	C/U
	ACPM-920502	B2/B5	GPIO	APT	3 x 4mm	C/U/L
	ACPM-920417	B4/B17	GPIO	APT	3 x 4mm	U/L
	ACPM-920413	B4/B13	GPIO	APT	3 x 4mm	U/L
	ACPM-920720	B7/B20	GPIO	APT	3 x 4mm	L
	ACPM-924140	B40/B41	GPIO	APT	3 x 4mm	L
Multit mode Multi band PA	ACPM-7500	B1/B2/B3(4)/B5/B8	GPIO	APT	5 x 7mm	C/U/L
	ACPM-7700	B1/B2/B3(4)/B5/B8	MIPI	APT	5 x 7mm	C/U/L
	ACPM-7717	B1/B2/B3/B4(B34,39)/B5/B8/B17(B20)	MIPI	APT	5 x 7mm	C/U/L/T
	ACPM-7600	B1/B2/B3/B4/B5/B8	MIPI	ET/APT	5 x 7mm	C/U/L
	ACPM-7620	B1/B2/B3/B4/B5/B8/B20	MIPI	ET/APT	5 x 7mm	C/U/L
	ACPM-7617	B1/B2/B3/B4/B5/B8/B17	MIPI	ET	5 x 7mm	C/U/L
PAD	AFEM-7613	B13	APT	APT	3 x 5.5mm	L
	AFEM-7007	B7	MIPI	ET	4 x 2.5mm	L
CMOS PA	AJAV-6101	B1	GPIO	APT	3 x 3mm	U
	AJAV-6781	B1/B8	GPIO	APT	3 x 4.2mm	U

System Block Diagrams and Suggested Products

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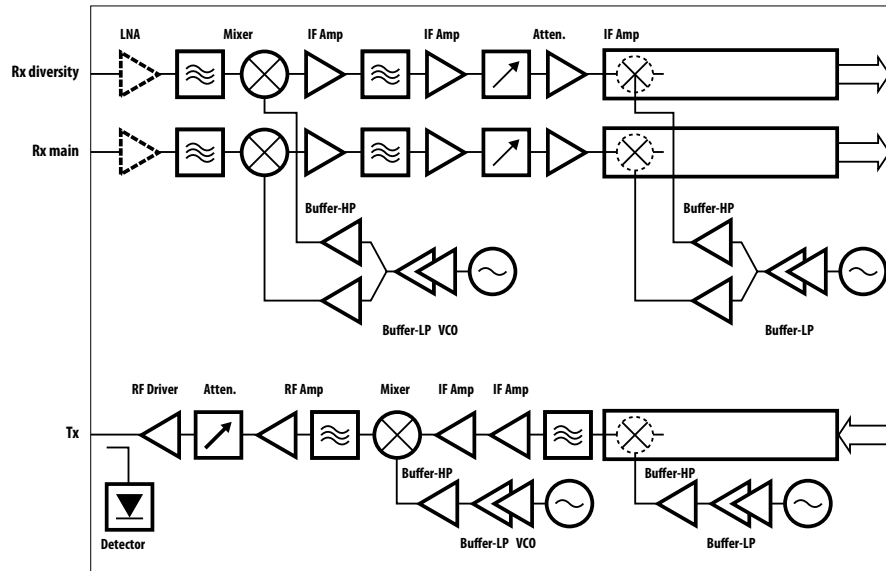
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Basestation Radiocard



Radiocard Suggested Components

Application	Part Number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB ¹ @ 2GHz	P1dB/dBm ¹ @ 2GHz	OIP3/dBm @ 2GHz	NF/dB ² @ 2GHz	Device Type and Package (mm)
LNA	MGA-13116	5/55	0.4 - 1.5	38	23.3	41.4	0.51	QFN 4x4x0.85
	MGA-13216	5/53	1.5 - 2.5	35.8	23.6	40.5	0.61	QFN 4x4x0.85
	MGA-13316 ⁶	5/53	2.2 - 4.0	34.3	23.5	41.8	0.76	QFN 4x4x0.85
	MGA-14516	5/45	1.4 - 2.7	31.7	—	23.5	0.66	QFN 4x4x0.85
	MGA-16116 ¹¹	4.8/61	0.45-1.45	18.4	21.2	21.2 (IIP3)	0.27	QFN 4x4x0.85
	MGA-16216 ¹²	4.8/52.5	1.44-2.35	18.4	19.5	19.5 (IIP3)	0.32	QFN 4x4x0.85
	MGA-16316 ¹³	4.8/53.3	1.95-4.0	18.2	18.7	15.5 (IIP3)	0.45	QFN 4x4x0.85
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-631P8 ⁵	4/60	0.4 - 1.5	17.5	18.0	33.1	0.53	E-pHEMT MMIC, LPCC 2x2
	MGA-632P8 ⁵	4/60	1.4 - 3	17.6	19.2	34.8	0.62	E-pHEMT MMIC, LPCC 2x2
	MGA-633P8	5/54	0.45 - 2	18	—	37	0.37	QFN 2x2x0.75
	MGA-634P8	5/48	1.5 - 2.3	17.4	22	36	0.37	QFN 2x2x0.75
	MGA-635P8	5/56	2.3 - 4.0	18	21.9	35.9	0.56	QFN 2x2x0.75
	MGA-636P8	4.8/105	0.45 - 1.5	18.5	23	41.5	0.5	QFN 2x2x0.75
	MGA-637P8	4.8/70	1.5 - 2.5	17.5	22	41.5	0.6	QFN 2x2x0.75
	MGA-638P8	4.8/90	2.5 - 4	17.5	22	39.5	0.8	QFN 2x2x0.75
	ATF-58143	3/30	0.45 - 6	16.5	19	30.5	0.5	E-pHEMT FET, SOT343
	ATF-54143	3/60	0.45 - 6	16.6	20	36.2	0.5	E-pHEMT FET, SOT343
	ALM-12124	5/227.7	1.880 - 2.025	39	23.5	36.5	0.85	MCOB 8.0x8.0x1.2
ALM-12224	5/228.7	2.30 - 2.40	36.8	22.7	38.5	0.99	MCOB 8.0x8.0x1.2	

Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.
- High reverse isolation: 50dB typical.

- Current adjustable: 20-60mA.
- Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
- MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
- MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

- MGA-13316 data tested at 2.5GHz
- ALM-12124 data tested at 2018MHz
- ALM-12224 data tested at 2400MHz
- MGA-16116 data tested at 900 MHz
- MGA-16216 data tested at 1950 MHz
- MGA-16316 data tested at 2.6 GHz

Basestation Radiocard

Radiocard Suggested Components

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain/dB ¹ @ 2GHz	P1dB/dBm ¹ @ 2GHz	OIP3/dBm @ 2GHz	NF/dB ² @ 2GHz	Device Type and Package (mm)
RF Amplifier	MGA-30116 ⁶	5/202.8	0.75 - 1	17	–	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	–	45.3	2.8	QFN 3x3
	MGA-30316 ⁷	5/198	3.3 - 3.9	12.8	–	44.4	2.7	QFN 3x3
	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89
	MGA-30789	5/100	2 - 6	11.7	–	41.8	3.3	SMT 4.5x4.1x1.5
	MGA-30889	5/65	0.04 - 2.6	15.5	–	38	1.9	SMT 4.5x4.1x1.5
	MGA-30989	5/51	2 - 6	12	–	36.8	2	SMT 4.5x4.1x1.5
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	MGA-31816	5/59	1.5 - 4.0	19.5	20.5	40.5	1.6	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	MGA-61563 ⁴	3/41	0.5 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
ADA-4789	4.1/180	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89	
Variable Gain Amplifier	ALM-80110 ⁸	5/110	0.4 - 1.6	(-27) to 13.6	23.3	40.3	4.8	MCOB 5.0x5.0x1.1
	ALM-80210	5/110	1.6 - 2.6	(-25.5) to 9.8	23.6	40.8	5.3	MCOB 5.0x5.0x1.1
	ALM-81224	5/383	1.45 - 2.75	23.8	27.4	44	2	MCOB 6.0x6.0x1.0
RF Driver	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89
	MGA-30789	5/100	2 - 6	11.7	–	41.8	3.3	SMT 4.5x4.1x1.5
	MGA-30889	5/65	0.04 - 2.6	15.5	–	38	1.9	SMT 4.5x4.1x1.5
	MGA-30989	5/51	2 - 6	12	–	36.8	2	SMT 4.5x4.1x1.5
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	MGA-31816	5/59	1.5 - 4.0	19.5	20.5	40.5	1.6	QFN 3x3
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	–	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ALM-31122 ⁶	5/394	0.7 - 1	15.6	–	47.6	2	MCOB 5.0x6.0x1.1
	ALM-31222	5/415	1.7 - 2.7	14.9	–	47.9	2.7	MCOB 5.0x6.0x1.1
	ALM-31322 ⁷	5/413	3.3 - 3.9	13.2	–	47.7	2.8	MCOB 5.0x6.0x1.1
	ALM-32120 ⁶	5/800	0.7 - 1.0	14	–	52	2.5	MCOB 7.0x10.0x1.1
	ALM-32220	5/800	1.7 - 2.7	14.8	–	50	3.5	MCOB 7.0x10.0x1.1
	ALM-32320 ⁷	5/800	3.3 - 3.9	12.5	–	50	2.5	MCOB 7.0x10.0x1.1

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
 2. NFmin figures for discrete FETs.

3. High reverse isolation: 50dB typical.
 4. Current adjustable: 20-60mA.
 5. Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
 6. MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.

7. MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.
 8. ALM-80110 data tested at 900MHz

Basestation Radiocard

Radiocard Suggested Components

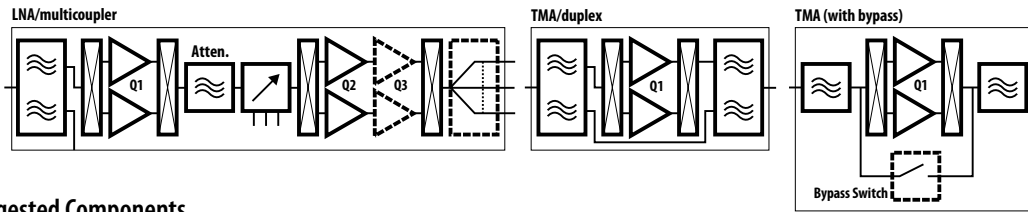
Application	Part Number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB ¹ @2GHz	P1dB/dBm ¹ @2GHz	OIP3/dBm @2GHz	NF/dB ² @2GHz	Device Type and Package (mm)
Mixer	IAM-92516	5/26	0.4 - 3.5	6 (CL)	9	27 (IIP3)	12.5	E-pHEMT MMIC, LPCC(3x3)
Buffer-High Power	MGA-565P8 ³	5/67	0.1 - 3.5	21.8	20 (Psat)	–	–	E-pHEMT MMIC, LPCC
	ABA-54563	5/79	DC - 3.4	23	16.1	27.3	4.4	Si MMIC, SOT363
Buffer-Low Power	ABA-31563	3/14	DC - 3	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6000	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6000	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6000	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6000	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
	AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89

Application	Part Number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB ¹ @500MHz	P1dB/dBm ¹ @500MHz	OIP3/dBm @500MHz	NF/dB ² @500MHz	Device Type and Package (mm)
IF Amplifier	MGA-30489	5/97	0.25 - 3.0	18.8	22.7	37	3.3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.4	22.2	44	3.0	SOT-89
	MGA-30789	5/100	2 - 6	11.7	–	41.8	3.3	SMT 4.5x4.1x1.5
	MGA-30889	5/65	0.04 - 2.6	15.5	–	38	1.9	SMT 4.5x4.1x1.5
	MGA-30989	5/51	2 - 6	12	–	36.8	2	SMT 4.5x4.1x1.5
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-62563 ⁴	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V						SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V						SOT323/363/23/143
Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design						SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design						SOT323/363/23/25
Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module						MCOB 3.8x3.8x1.0

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. High reverse isolation: 50dB typical.
4. Current adjustable: 20-60mA.
5. Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
6. MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
7. MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

Basestation Low Noise Amplifier (LNA) Basestation Tower Mounted Amplifiers (TMA)



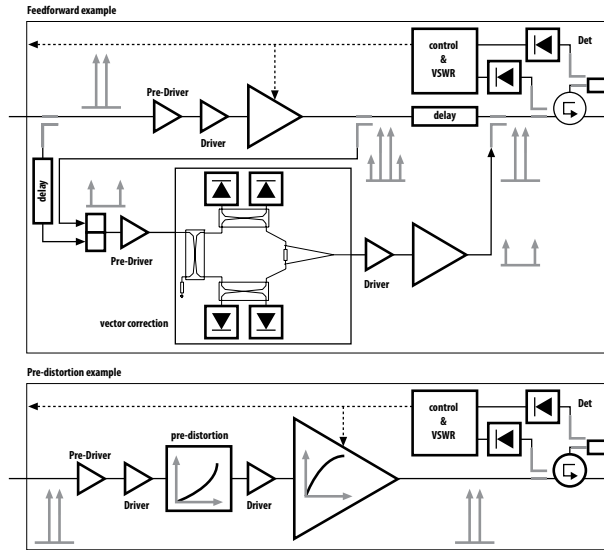
LNA & TMA Suggested Components

Application	Part Number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB ¹ @ 2GHz	P1dB/dBm ¹ @ 2GHz	OIP3/dBm @ 2GHz	NF/dB ² @ 2GHz	Device Type and Package (mm)
Q1	MGA-13116	5/55	0.4 - 1.5	38	23.3	41.4	0.51	QFN 4x4x0.85
	MGA-13216	5/53	1.5 - 2.5	35.8	23.6	40.5	0.61	QFN 4x4x0.85
	MGA-13316	5/53	2.2 - 4.0	34.3	23.5	41.8	0.76	QFN 4x4x0.85
	MGA-14516	5/45	1.4 - 2.7	31.7	-	23.5	0.66	QFN 4x4x0.85
	MGA-16116 ⁷	4.8/61	0.45-1.45	18.4	21.2	21.2 (IIP3)	0.27	QFN 4x4x0.85
	MGA-16216 ⁸	4.8/52.5	1.44-2.35	18.4	19.5	19.5 (IIP3)	0.32	QFN 4x4x0.85
	MGA-16316 ⁹	4.8/53.3	1.95-4.0	18.2	18.7	15.5 (IIP3)	0.45	QFN 4x4x0.85
	MGA-631P8 ³	4/60	0.4 - 1.5	17.5	18.0	33.1	0.53	E-pHEMT MMIC, LPCC 2x2
	MGA-632P8 ³	4/60	1.4 - 3	17.6	19.2	34.8	0.62	E-pHEMT MMIC, LPCC 2x2
	MGA-633P8	5/54	0.45 - 2	18	-	37	0.37	QFN 2x2x0.75
	MGA-634P8	5/48	1.5 - 2.3	17.4	22	36	0.37	QFN 2x2x0.75
	MGA-635P8	5/56	2.3 - 4.0	18	21.9	35.9	0.56	QFN 2x2x0.75
	ALM-11036	5/92	0.776 - 0.87	15.6	4	37.6	0.78	SMT 7x10
	ALM-11136	5/92	0.87 - 0.915	15.4	4.5	38.2	0.76	SMT 7x10
	ALM-11236	5/99	1.71 - 1.85	15.9	3.5	32.3	0.67	SMT 7x10
	ALM-11336	5/100	1.85 - 1.98	15.3	3.8	35.5	0.72	SMT 7x10
	ATF-58143	3/30	0.45 - 6	16.5	19	30.5	0.5	E-pHEMT FET, SOT343
	ATF-54143	3/60	0.45 - 6	16.6	20	36.2	0.5	E-pHEMT FET, SOT343
	ATF-55143	2.7/10	0.45 - 6	17.7	14	24.2	0.6	E-pHEMT FET, SOT343
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC	
Q2/Q3	MGA-30116 ⁴	5/202.8	0.75 - 1	17	-	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	-	45.3	2.8	QFN 3x3
	MGA-30316 ⁵	5/198	3.3 - 3.9	12.8	-	44.4	2.7	QFN 3x3
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	MGA-31816	5/59	1.5-4.0	19.5	20.5	40.5	1.6	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-636P8	4.8/105	0.45 - 1.5	18.5	23	41.5	0.5	QFN 2x2x0.75
	MGA-637P8	4.8/70	1.5 - 2.5	17.5	22	41.5	0.6	QFN 2x2x0.75
	MGA-638P8	4.8/90	2.5 - 4	17.5	22	39.5	0.8	QFN 2x2x0.75
	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	-	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
Bypass Switch - PIN Diodes	HSMP-389x	General purpose switch, Ct typ. = 0.4pF @0V						SOT-323/363/23/143
	HSMP-489x	Low inductance, shunt, Ct typ. = 0.4pF @0V						SOT323/23
	HSMP-386x	Higher linearity switch, Ct typ. = 0.2pF @0V						SOT323/363/23/25
Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design						SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design						SOT323/363/23/25
Attenuator-Module	ALM-38140	Low distortion, high dynamic range attenuator module						MCOB 3.8x3.8x1.0

Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.
- Both MGA-631P8 and MGA-632P8 come with integrated active bias circuit. MGA-631P8 data tested at 900MHz.
- MGA-30116 data tested at 900MHz.
- MGA-30316 data tested at 3.5GHz.
- MGA-16116 data tested at 900 MHz.
- MGA-16216 data tested at 1950 MHz.
- MGA-16316 data tested at 2.6 GHz.

Basestation Multi-carrier Power Amplifier (MCPA)



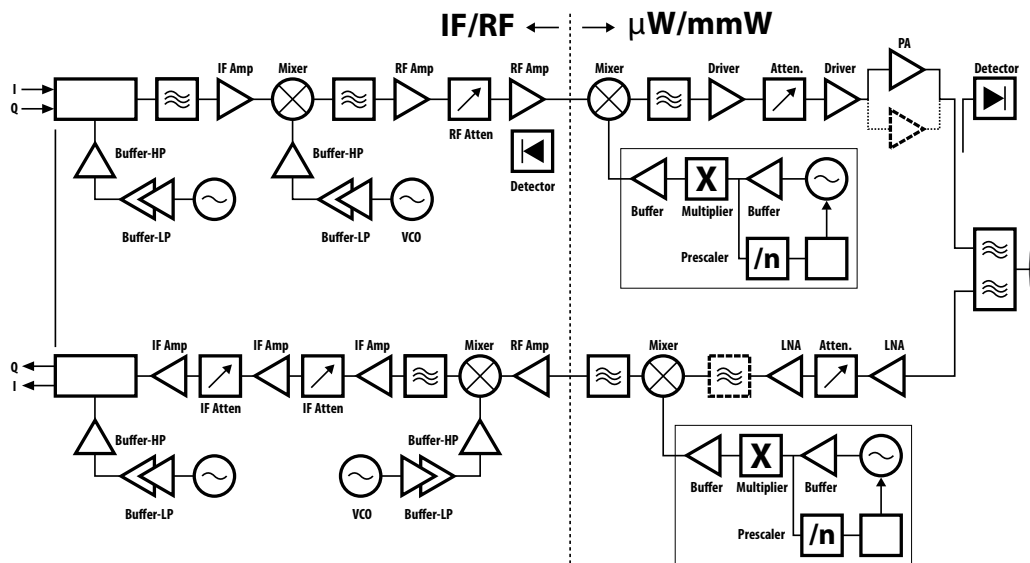
MCPA Suggested Components

Application	Part Number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB ¹ @ 2GHz	P1dB/dBm ¹ @ 2GHz	OIP3/dBm @ 2GHz	NF/dB ² @ 2GHz	Device Type and Package (mm)
Pre-Driver	MGA-30116 ³	5/202.8	0.75 - 1	17	–	44.1	2	QFN 3x3
	MGA-30216	5/206	1.7 - 2.7	14.2	–	45.3	2.8	QFN 3x3
	MGA-30316 ⁴	5/198	3.3 - 3.9	12.8	–	44.4	2.7	QFN 3x3
	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89
	MGA-30789	5/100	2 - 6	11.7	–	41.8	3.3	SMT 4.5x4.1x1.5
	MGA-30889	5/65	0.04 - 2.6	15.5	–	38	1.9	SMT 4.5x4.1x1.5
	MGA-30989	5/51	2 - 6	12	–	36.8	2	SMT 4.5x4.1x1.5
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	MGA-31816	5/59	1.5 - 4.0	19.5	20.5	40.5	1.6	QFN 3x3
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC
	ATF-52189	4.5/200	0.05 - 6	16	27	42	1.21	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17	26.5	42	0.96	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	15.5	23	40	0.62	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	20	24.5	38	0.6	E-pHEMT FET, LPCC
ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89	
Driver	ATF-50189	4.5/280	0.05 - 6	15.5	29	45	1.1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	14.7	28	45	–	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ALM-31122 ³	5/394	0.7 - 1	15.6	–	47.6	2	MCOB 5.0x6.0x1.1
	ALM-31222	5/415	1.7 - 2.7	14.9	–	47.9	2.7	MCOB 5.0x6.0x1.1
	ALM-31322 ⁴	5/413	3.3 - 3.9	13.2	–	47.7	2.8	MCOB 5.0x6.0x1.1
	ALM-32120 ³	5/800	0.7 - 1.0	14	–	52	2.5	MCOB 7.0x10.0x1.1
	ALM-32220	5/800	1.7 - 2.7	14.8	–	50	3.5	MCOB 7.0x10.0x1.1
	ALM-32320 ⁴	5/800	3.3 - 3.9	12.5	–	50	2.5	MCOB 7.0x10.0x1.1
	ALM-81224	5/383	1.45 - 2.75	23.8	27.4	44	2	MCOB 6.0x6.0x1.0
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V						SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V						SOT323/363/23/143
Vector Correction - PIN Diodes	HSMP-481x	Low inductance, shunt, very low distortion, Ct typ. = 0.2pF @0V						SOT323/23
	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V						SOT323/23/25

Notes:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- NFmin figures for discrete FETs.
- MGA-30116, ALM-31122 and ALM-32120 data tested at 900MHz.
- MGA-30316, ALM-31322 and ALM-32320 data tested at 3.5GHz.

Microwave Link (Point-to-Point/Point-to-Multipoint)



Microwave Link MMICs Suggested Components

Application	Part Number	Bias V/mA	Freq. Range GHz	Typical Performance				Package (mm)
				Gain dB	P1dB dBm	OIP3 dBm	NF dB	
Power Amplifiers	AMGP-6432	6/700	28 - 31	20	33	40 @ 30 GHz	-	SM 5x5
	AMGP-6434	6/1400	28 - 31	20	35.5	42 @ 30 GHz	-	SM 5x5
	AMMP-6408	5/650	6 - 18	18	28	38	4.5	SM 5x5
	AMMC-6408	5/650	6 - 18	19	29	38	4.3	chip
	AMMC-6425	5/900 - 0.6	18 - 28	18.5	28.5	38	-	chip
	AMMC-6431	5/0.65	25-33	19	28.5	38	-	chip
Driver/Buffer Amps1	AMMC-6442	5/0.7	37-40	23	30	18	-	chip
	AMMP-5618	5/107	6 - 20	13	19	30	4.4	SM 5x5
	AMMC-5618	5/107	6 - 20	14.5	19.5	26	4.4	chip
	AMMP-5620	5/95	6 - 20	17.5	15	22.5	5.1	SM 5x5
	AMMC-5620	5/95	6 - 20	19	15	23.5	4.2	chip
	AMMC-5040	4.5/300 - 0.45	20 - 45	25	19.5	30	-	chip
	AMMP-6333	5/230	18-33	22	23	30	-	SM 5x5
Low Noise Amplifiers	AMMC-6333	5/230	18-33	22	23	30	-	chip
	AMMC-6345	5/480 - 0.7	20 - 45	20	24	32	-	chip
	VMMK-1225	2/20	0.5 - 26	11	8	23	1	SM
	VMMK-1218	3/20	0.5 - 18	10.7	12	12	0.81	SM 1x0.5
	AMMP-6220	3/55	6 - 20	22	10	20	2.5	SM 5x5
	AMMC-6220	3/55	6 - 20	23	9	19	2	chip
	AMMP-6222	4/120	7 - 21	24	15.5	29	2.3	SM 5x5
	AMMC-6222	4/120	7 - 21	25	16	29	2.1	chip
	AMMP-6232	4/138	18 - 32	23	18	29	3	SM 5x5
	AMMC-6232	4/138	18 - 32	24	19	29	2.8	chip
Travelling Wave Amplifiers	AMMP-6233	3/65	18 - 32	23	8	19	2.6	SM 5x5
	AMMC-6241	3/60	26 - 43	20	10	20	2.7	chip
	AMMP-5024	7/200	(30k) - 40	15	22	30	4.4	SM 5x5
	AMMC-5024	7/200 - 3	(30k) - 40	16	22.5	30	4.6	chip
	AMMC-5025	5/100	(30k) - 80	8	15	20	-	chip
AMMC-5026	7/150 - 1	2 - 35	10.5	24	31	3.6	chip	

Notes:

1. Also see Low Noise Amplifiers.

Wireless Infrastructure

Microwave Link (Point-to-Point/Point-to-Multipoint)

Microwave Link MMICs Suggested Components

Application	Part Number	Freq. Range (GHz)	Typical Performance					Package (mm)
			In/Output RL (dB)	Control Range (dB)	Min. IL (dB)	Control Voltage (V)	IIP3 (dBm)	
Variable Attenuator	AMMC-6630	5 - 45	10/10	20	3.5 @ 25GHz	0 to +1V	+23 @ 25GHz	Chip
	AMMC-6640	DC - 50	12/12	20	4 @ 50GHz	0 to +1.2V	+27 @ 10 dB/30GHz	Chip
	AMMC-6650	DC - 40	15/15	22	3.1 @ 40GHz	0 to +1.5V	+7 @ 22GHz	Chip
	AMMP-6630	5 - 30	10/10	20	3.5 @ 25GHz	0 to +1V	+23 @ 25GHz	SM 5x5
	AMMP-6640	DC - 40	10/10	20	4.4 @ 30GHz	0 to +1.2V	+27 @ 10 dB/30GHz	SM 5x5
	AMMP-6650	DC - 30	12/12	22	2.1 @ 30GHz	0 to +1.5V	+7 @ 22GHz	SM 5x5

Application	Part Number	Input Freq. (GHz)	Typical Performance					Package (mm)
			Output Freq. (GHz)	IP1dB (dBm)	Pout (dBm)	Fo (dBc)	3Fo (dBc)	
Multiplier	AMMP-6125	5 - 12	10 - 24	0	22	20	20	SM 5x5
	AMMP-6120	4 - 12	8 - 24	2	15	25	20	SM 5x5

Application	Part Number	RF Freq./IF (GHz)	Typical Performance					Package (mm)
			Im Rej (dB)	RF/IF RL. (dB)	Conversion Gain (dB)	LO/RF Isolation (dB)	IIP3 (dBm)	
Mixer/Converter	AMMP-6522	7 - 20/DC - 3.5	15	12/12	-13	-	-2 @ 16 GHz	SM 5x5
	AMMP-6530	5 - 30/DC - 5	15	5/10	-5 @ 20 GHz	25	24 @ 23 GHz	SM 5x5
	AMMP-6532	20 - 32/1 - 5	15	9/-	-13	-	-2 @ 26 GHz	SM 5x5
	AMMP-6545	18 - 40/DC - 3.5	-	-	-11 @ 36GHz	30	12	SM 5x5
	AMMP-6546	18 - 40/DC - 3.5	-	-	-11 @ 35GHz	30	16 @ 30 GHz	SM 5x5
	AMMC-6530	5 - 30/DC - 5	15	5/10	-5 @ 20 GHz	25	24 @ 23 GHz	Chip
	AMMC-6545	18 - 45/DC - 3.5	-	-	-9 @ 30GHz	33	18	Chip

Wireless Infrastructure

Microwave Link (Point-to-Point/Point-to-Multipoint)

Microwave/Millimeter Wave Diode Suggested Components

Application	Part Number	Description	Package
Detector - Schottky diodes	HSCH-5310/5330	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Mixers - Schottky diodes	HSCH-5310/5330	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Multiplier - Schottky diodes	HSCH-5310/5330	Si single, Ct=0.1pF, med. barrier/low barrier	Beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	Beamlead
Attenuator - PIN diodes	HPND-4005	Si single, Ct=17fF, t=100ns	Beamlead
Switch - PIN diodes	HPND-4005	Si single, Ct=17fF, t=100ns	Beamlead
	HPND-4028	Si single. Ct=45fF, t=36ns	Beamlead

Microwave Link - IF Component Suggestions

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain (dB) @ 2GHz	P1dB (dBm) @ 2GHz	OIP3 (dBm) @ 2GHz	NF (dB) @ 2GHz	Device Type and Package (mm)	
RF Amplifier	MGA-30489	5/97	0.25 - 3.0	13.3	23.3	39	3	SOT-89	
	MGA-30689	5/104	0.04 - 2.6	14.6	22.5	40	3.3	SOT-89	
	MGA-30789	5/100	2 - 6	11.7	-	41.8	3.3	SMT 4.5x4.1x1.5	
	MGA-30889	5/65	0.04 - 2.6	15.5	-	38	1.9	SMT 4.5x4.1x1.5	
	MGA-30989	5/51	2 - 6	12	-	36.8	2	SMT 4.5x4.1x1.5	
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89	
	MGA-31289	5/124	1.5 - 3	18.7	24	41.8	3	SOT-89	
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89	
	MGA-31489	5/69	1.5 - 3	19.5	21.9	37.3	1.9	SOT-89	
	MGA-31589	5/146	0.45 - 1.5	20.4	27.2	45.3	1.9	SOT-89	
	MGA-31689	5/168	1.5 - 3	18.1	27.6	44.9	1.9	SOT-89	
	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343	
	MGA-53589	5/52	0.05 - 3.0	15.8	18.2	37	1.7	SOT-89	
	MGA-545P8	3.3/127	0.05 - 7	18.6	21.7	34	2.7	E-pHEMT MMIC, LPCC	
	MGA-61563 ¹	3/41.6	0.1 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363	
	Mixer	ABA-53563	5/35	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
ABA-54563		5/81	DC - 3	22.5	16	26	4.2	Si MMIC, SOT363	
ADA-4789		4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89	
Buffer-High Power		IAM-92516	5/26	0.4 - 3.5	6 (CL)	9	27 (IIP3)	12.5	E-pHEMT MMIC, LPCC(3x3)
		MGA-565P8 ²	5/67	0.1 - 3.5	21.8	20 (Psat)	-	-	E-pHEMT MMIC, LPCC
Buffer-Low Power		ABA-54563	5/81	DC - 3	22.5	16	27.3	4.4	Si MMIC, SOT363
		ABA-31563	3/14	DC - 3	21.5	2.2	13.1	3.8	Si MMIC, SOT363
		ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
		ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
		ABA-53563	5/35	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
		AVT-50663	5/36	DC - 6000	15.3	12.5	25	4	SOT-363 (SC70)
		AVT-51663	5/37	DC - 6000	19.6	12.9	25.1	3.2	SOT-363 (SC70)
		AVT-52663	5/45	DC - 6000	15.3	12.7	27	4	SOT-363 (SC70)
		AVT-53663	5/48	DC - 6000	19.6	15.1	26.5	3.2	SOT-363 (SC70)
		AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
AVT-55689		5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89	

Notes:

1. Current Adjustable: 20-60mA.
2. High Reverse Isolation: 50dB typical.

Wireless Infrastructure

Microwave Link (Point-to-Point/Point-to-Multipoint)

Microwave Link - IF Component Suggestions

Application	Part Number	Features	Device Type and Package
Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V	SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
RF Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design	SOT323/23/25/SOD-323
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25/SOD-323
Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module	MCOB 3.8x3.8x1.0mm

Application	Part Number	Typ. Bias V/mA	Frequency Range/GHz	Gain (dB) @ 500MHz	P1dB (dBm) @ 500MHz	OIP3 (dBm) @ 500MHz	NF (dB) @ 500MHz	Device Type and Package
IF Amplifier	MGA-62563 ¹	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	MGA-30489	5/97	0.25 - 3.0	18.8	22.7	37	3.3	SOT-89
	MGA-30689	5/104	0.04 - 2.6	14.4	22.2	44	3.0	SOT-89
	MGA-30889	5/65	0.04 - 2.6	15.5	–	38	1.9	SMT 4.5x4.1x1.5
	MGA-31189	5/111	0.05 - 2	21	24	42	3	SOT-89
	MGA-31389	5/73	0.05 - 2	21.3	22.2	38.6	2	SOT-89
	MGA-31716	5/58	2	20.2	21.2	41	1.9	QFN 3x3
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6000	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6000	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6000	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6000	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89	

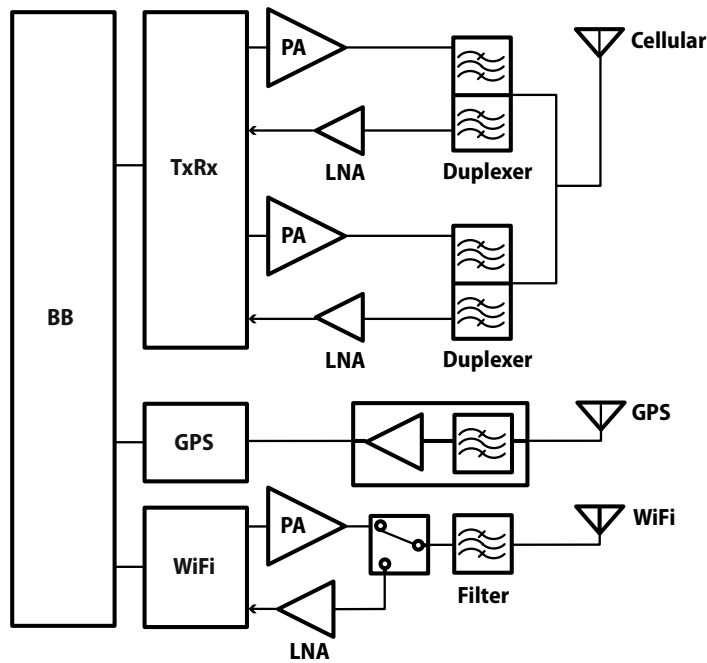
Application	Part Number	Features	Package
Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 & AN5262 pi-attenuator design	SOT323/23/25
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25
Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module	MCOB 3.8x3.8x1.0mm

Notes:

1. Current Adjustable: 20-60mA

Wireless Infrastructure

Small Cell Front End



Small Cell Front End Suggested Components

Application	Part Number	Freq. Range MHz	Typical Performance					Voltage (V)	Current (mA)	Operating Range
			Gain dB	P1dB dBm	I/O RL	OIP3 dBm	NF dB			
Low Noise Amplifiers	MGA-62563	500	22.0	18.0	>10.0	35.0	0.8	3.00	60	50-3000
		1000	20.0	17.6	>10.0	33.5	0.9	3.00	60	50-3000
		2000	15.5	17.7	>10.0	33.0	1.2	3.00	60	50-3000
	MGA-683P8	900	17.6	21.9	>10.0	34.7	0.6	5.00	45	400-1500
	MGA-684P8	1900	17.1	21.3	>10.0	31.0	0.78	5.00	34	1500-4000

Application	Part Number	Freq. Range GHz	Test Freq. (GHz)	Vdd (V)	Idq (mA)	Gain (dB)	P1dB (dB)	Pout @ 2.5% EVM	Band	Package (mm)
LTE/UMTS/CDMA Power Amplifiers	MGA-43228	2.3 - 2.5	2.4	5	1023	38.5	36	29.1	40, WLAN 2.4G	QFN 5x5
	MGA-43328	2.5 - 2.7	2.6	5	1017	37.4	36	29.3	7, 38, 41	QFN 5x5
	MGA-43428	851-894 MHz	0.88	5	800	>30	36	27dBm@ 50dBc ACLR	5, 26	MCOB 5x5
	MGA-43528	1.93-1.995	1.96	5	1000	>30	35		2, 25, 36	MCOB 5x5
	MGA-43628	2.0 - 2.2	2.14	5	1000	>30	35		1, 4	MCOB 5x5
	MGA-43728	2.62-2.69	2.65	5	755	38.3	36	27.3dBm @48dBc ACLR	7	MCOB 5x5
	MGA-43828	0.925-0.960	0.94	5	730	32.8	36	27.5dBm @50dBc ACLR	8	MCOB 5x5
	MGA-43003	1.805-1.88	1.842	5	360	41.7	36	27dBm @48dBc ACLR	3, 9, 39	MCOB 5x5
	MGA-43013	728-756 MHz	0.746	5	380	34	36	27 dBm @48dBc ACLR	12, 13, 17	MCOB 5x5
	MGA-43040	2.3-2.4	2.35	5	380	42	35	27 dBm @48dBc ACLR	30, 40	MCOB 5x5
Carrier Grade WiFi	MGA-43024	2401-2473 MHz	2.442	5	450	40.8	34	26.8	2.4GHz	MCOB 5x5

Wireless Infrastructure

Small Cell Front End

Small Cell Front End Suggested Components

Application	Part Number	Typ. Bias V/ mA	NF/dB	Gain/dB	IIP3/dBm	Device Type and Package (mm)
GPS Low Noise Amplifiers	ALM-2506	2.85/8	0.8	14.3	4.7	Amp, MCOB 2x2x1.1
	MGA-231T6	2.85/6	0.9	18.5	2.0	Amp, UTSLP 2x1.3x0.4
	MGA-24106	2.7/3.3	0.97	17.9	-2.0	Amp, μ DFN 1.5x1.3x0.5
	MGA-310G	2.7/8	0.82	15.2	1.8	GNSS Amp, UQFN 1.1x1.1x0.5
	MGA-61563	3.0/9	1.18	16	-3	Amp, SOT-363
	MGA-635T6	2.85/4.9	0.86	14.6	3.5	Amp, UTSLP 2x1.3x0.4
	*ATF-55143	2.0/10	0.6	17.4	-0.6	E-pHEMT FET, SOT343
	AGPS-L001	2.7/5	0.75	17	2.4	GNSS Amp, MCOB 2x2.5x1

Note: *Refer to Application Note 1376.

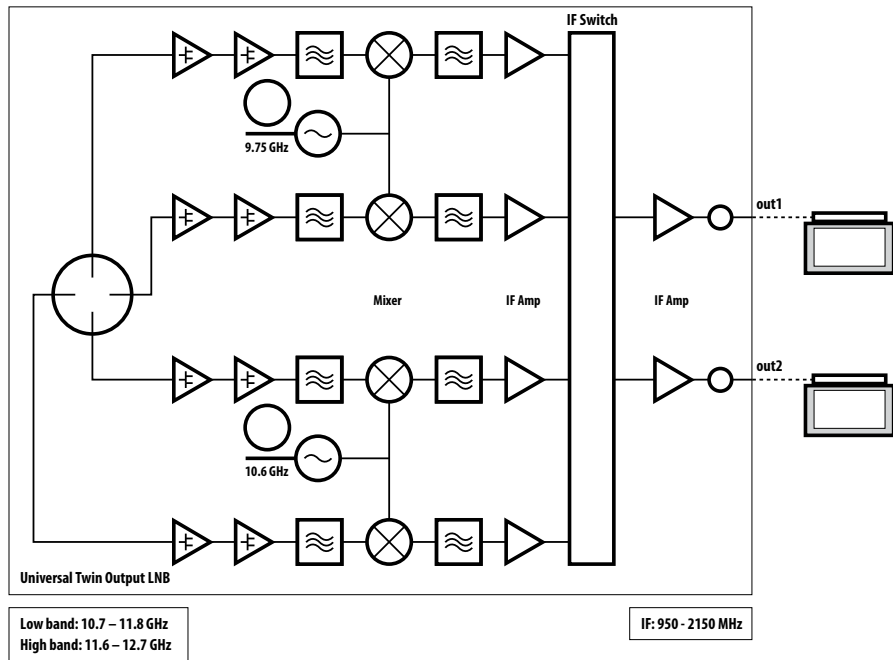
Application	Part Number	Typ. Bias V/ mA	NF/dB	Gain/dB	IIP3/dBm	Cell-Band Rejection/dBc	PCS-Band Rejection/dBc	Device Type and Package (mm)
GPS/GNSS Low Noise Amplifiers/ Filter Modules	ALM-1612	2.7/6	0.95	18.2	2	69	67	LNA/F, MCOB 3.3x2.1x1
	ALM-2412	2.85/9	0.85	13.5	6.1	63	65	LNA/F, MCOB 3.3x2.1x1.1
	ALM-1712	2.7/8	1.65	12.8	3	104	92.6	F/LNA/F, MCOB 4.5x2.2x1.0
	ALM-1812	2.8/6	1.9	18.5	2	95	90	F/LNA/F, MCOB 4.5x2.2x1.0
	ALM-2712	2.7/7.5	12.6	14.2	2	–	–	F/LNA/F, MCOB 3x2.5x1
	ALM-GN001	2.7/5	1.6	16.5	1	53	45	F/LNA, DFN 2.3x1.7x0.85
	ALM-3012	2.7/7.5	0.85	17	0.5	50	50	LNA/F, MCOB 2x2.5x1

Note: F = FBAR Filter.

FBAR Filter

Application	Part Number	Band	Pass Band (MHz)	Typical Insertion Loss (dB)
Small Cell and Carrier Grade WiFi	ACFF-1024	2.4GHz ISM	2401-2482	1.5 dB
	ACMD-7614	1	1920-1980, 2110-2170	1.4, 1.6
	ACMD-6x02, 74xx	2	1850-1910, 1930-1990	1.4, 1.4
	ACMD-6x03	3	1710-1785, 1805-1880	1.5, 1.6
	ACMD-7609	4	1710-1755, 2110-2155	1.3, 1.3
	ACMD-6xx7	7	2500-2570, 2620-2690	1.8, 1.6
	ACMD-7610	8	880-915, 925-960	2.2, 2.2
	ACMD-6x25	25	1850-48-1909.52, 1930.48-1989.52	1.4, 1.5
	ACPF-8x40	40	2300-2400	2
ACPF-7x41	41	2500-2700	2.4	

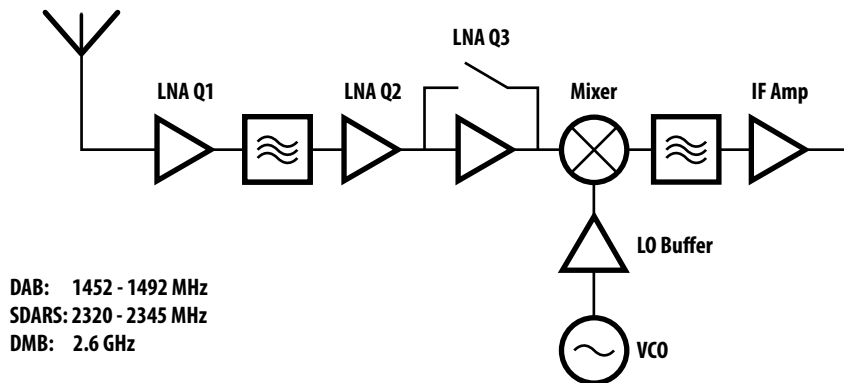
DBS Satellite TV System



DBS Satellite TV System Suggested Components

Application	Part number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
IF Amplifier	ABA-31563	3/14	DC - 3	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/79	DC - 3.4	23	16.1	27.8	4.4	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6000	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6000	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6000	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6000	19.6	15.1	26.5	3.2	SOT-363 (SC70)
	AVT-54689	5/48	0.05 - 6	17.1	17.4	29.6	4.1	SOT-89
	AVT-55689	5/75	0.05 - 6	17.2	19.5	32.5	4.3	SOT-89
	MGA-61563	3/41	0.1 - 6	15.5	15.1	31.7	1.0	E-pHEMT MMIC, SOT363
IF Switch	HSMP-386x	Higher linearity switch, Ct typ = 0.2pF @0V						SOT323/363/23/25
	HSMP-389x	General purpose switch, Ct typ. = 0.4pF @0V						SOT323/363/23/143
	HMPS-389x	General purpose switch, Ct typ. = 0.4pF @0V						Minipak
Mixer - Schottky Diodes	HSMS-8202	Ct max = 0.26pF @0V						SOT23
		RD max = 14W @ IF=5Ma						

Mobile DAB/SDARS/DMB-S Digital Receivers



Mobile DAB/SDARS/DMB-S Digital Receivers Suggested Components

Application	Part number	Typ. Bias V/ mA	Gain/dB ¹			OIP3/dBm			NF/dB ²			Device Type and Package (mm)
			DAB	SDARS	DMB-S	DAB	SDARS	DMB-S	DAB	SDARS	DMB-S	
LNA Q1/Q2	ATF-55143	2.7/10	20.0	17.0	16.0	23.0	24.0	24.0	0.3	0.45	0.5	E-pHEMT FET, SOT343
	ATF-551M4	2.7/10	20.0	16.5	16.0	23.0	24.2	24.2	0.3	0.45	0.5	E-pHEMT FET, MiniPak
	MGA-635T6	2.85/4.9	14.6	12.0	–	3.5	4.5	–	0.86	0.96	–	E-pHEMT, UTSLP 2x1.3x0.4
LNA Q3	MGA-645T6	3/7	–	15.0	14.2	–	7	7.8	–	1.1	1.15	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-71543 ³	3/10 ⁴	16.5	15.2	14.6	19.5	18.2	17.6	0.7	0.8	0.85	GaAs MMIC, SOT343
	MGA-72543 ³	3/20 ⁴	14.3	13.2	12.8	24.8	23.7	23.3	1.4	1.45	1.45	GaAs MMIC, SOT343
	MGA-725M4 ³	3/20 ⁴	16.6	15.3	14.6	26.5	25.2	24.5	1.2	1.3	1.3	GaAs MMIC, MiniPak

Notes:

- Gain for discrete FETs when matched for best IP3.
- NFmin figures for LNA parts.
- LNA bypass switch included.
- Current adjustable to set linearity performance

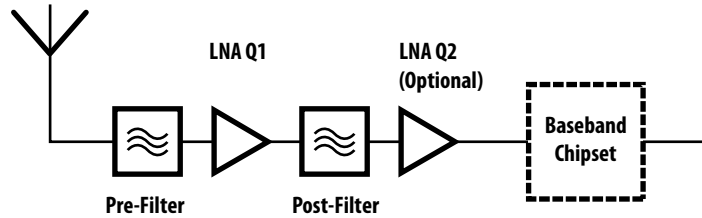
Application	Part number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
LO Buffer	ABA-31563	3/14.5	DC - 3	21	2	13	3.8	Si MMIC, SOT363

DMB-T/ISDB-T Receivers Suggested Components

Application	Part number	Typ. Bias V/mA	Gain/dB @ 500MHz	OIP3/dBm @ 500MHz	NF/dB @ 500MHz	Device Type and Package (mm)
LNA Q1/Q2	MGA-685T6	3.0/10	18.9	18.7	0.93	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-68563	3.0/10	19.7	20.0	1.0	E-pHEMT MMIC, SOT363
LNA Q3	MGA-785T6	3.0/10	15.7	16.8	1.5	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-725M4	3.0/9	14	16.5	1.7	GaAs MMIC, MiniPak

Wireless Infrastructure

GPS/GLONASS Receivers



Mobile GPS Receivers Suggested Components

Application	Part Number	Typ. Bias V/ mA	NF/dB	Gain/dB	IIP3/dBm	Device Type and Package (mm)
LNA Q1/Q2	ALM-2506	2.85/8	0.8	14.3	4.7	E-pHEMTF, MCOB 2x2x1.1
	MGA-231T6	2.85/6	0.9	18.5	2.0	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-24106	2.7/3.3	0.97	17.9	-2.0	uDFN 1.5x1.3x0.5
	MGA-310G	2.7/8	0.82	15.2	1.8	E-pHEMT MMIC, UQFN 1.1x1.1x0.5
	MGA-61563	3.0/9	1.18	16	-3	E-pHEMT MMIC, SOT-363
	MGA-635T6	2.85/4.9	0.86	14.6	3.5	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-665P8	3.0/21	1.22	20.8	-0.5	E-pHEMT MMIC, LPCC 2x2
	*ATF-55143	2.0/10	0.6	17.4	-0.6	E-pHEMT FET, SOT343
AGPS-L001	2.7/5	0.75	17	2.4	MCOB 2x2.5x1	

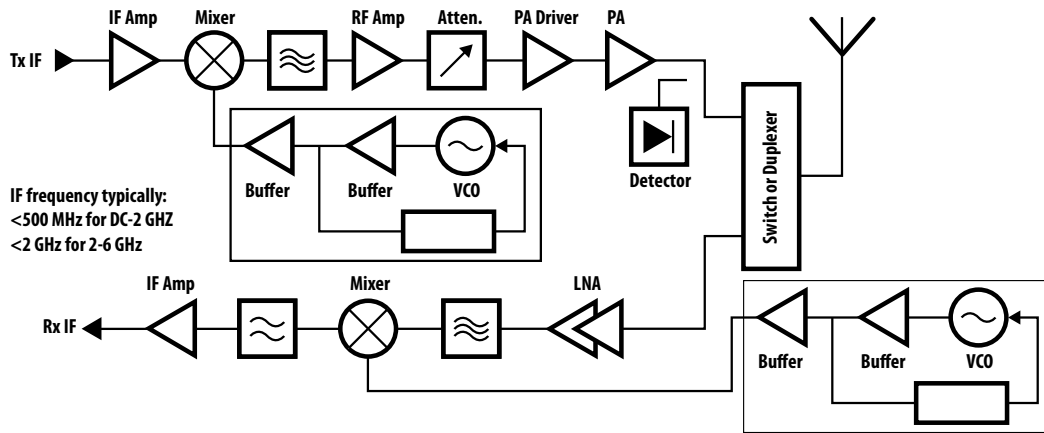
Note:

*Refer to Application Note 1376.

Application	Part Number	Typ. Bias V/ mA	NF/dB	Gain/dB	IIP3/dBm	Cell-Band Rejection/dBc	PCS-Band Rejection/dBc	Device Type and Package (mm)
LNA Q1 with Inte- grated Post Filter	ALM-1612	2.7/6	0.95	18.2	2.	69	67	MCOB 3.3x2.1x1
	ALM-2412	2.85/9	0.85	13.5	6.1	63	65	MCOB 3.3x2.1x1.1
LNA Q1 with Integrated Pre and Post Filters	ALM-1712	2.7/8	1.65	12.8	3	104	92.6	E-pHEMT & FBAR, MCOB 4.5x2.2x1.0
	ALM-1812	2.8/6	1.9	18.5	2	95	90	E-pHEMT & FBAR, MCOB 4.5x2.2x1.0
	ALM-2712	2.7/7.5	12.6	14.2	2	–	–	MCOB 3x2.5x1
LNA Q1 with Inte- grated Pre Filter	ALM-GN001	2.7/5	1.6	16.5	1	53	45	E-pHEMT & FBAR, DFN 2.3x1.7x0.85
	ALM-3012	2.7/7.5	0.85	17	0.5	50	50	MCOB 2x2.5x1

Wireless Infrastructure

2-6 GHz Systems (including 802.11 a/b/g and 802.16)



2-6 GHz Systems Suggested Components

Application	Part Number	Typical Performance					Package (mm)
		Test Bias V/mA	Test Freq. GHz	Gain ¹ dB	Linear Pout dBm	EVM %	
PA	MGA-22003	–	2.5	35	–	–	Small Size 3x3x1
	MGA-23003	–	3.5	35	–	–	Small Size 3x3x1
	MGA-25203	–	5.4	30	–	–	Small Size 3x3x1
	MGA-412P8	3.3/95	2.452	25.5	19	3.0	E-pHEMT MMIC, LPCC
	MGA-425P8 ²	3.3/58	5.25	16.0	12	3.0	E-pHEMT MMIC, LPCC
	MGA-43228	5/500	2.4	38.5	29.2	2.5	QFN 5x5x0.85
	MGA-43328	5/470	2.6	37.3	29.3	2.5	QFN 5x5x0.85
	MGA-545P8	3.3/127	5.825	11.5	16	5.6	E-pHEMT MMIC, LPCC
	ALM-31222	5/415	2	14.9	–	–	MCOB 5.0x6.0x1.1
	ALM-31322	5/413	3.5	13.2	–	–	MCOB 5.0x6.0x1.1
	ALM-32220	5/800	2	14.8	–	–	MCOB 7.0x10.0x1.1
	ALM-32320	5/800	3.5	12	–	–	MCOB 7.0x10.0x1.1

Application	Part Number	Typical Performance						Package (mm)
		Test Bias V/mA	Test Freq. GHz	Gain ¹ dB	P1dB ¹ dBm	OIP3 dBm	NF dB	
PA Driver	MGA-30216	5/206	2	14.2	–	45.3	2.8	QFN 3x3
	MGA-30316	5/198	3.5	12.8	–	44.4	2.7	QFN 3x3
	MGA-53543	5/54	1.9	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
	ATF-501P8	4.5/280	2	15	29	45.5	1	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	2	14.8	30	41.7	1.4	E-pHEMT FET, LPCC
	ATF-521P8	4.5/200	2	17	26.5	42	1.5	E-pHEMT FET, LPCC
	ATF-531P8	4/135	2	20	24.5	38	0.6	E-pHEMT FET, LPCC
	ATF-541M4	3/60	2	17.5	21.4	35.8	0.5	E-pHEMT FET, MiniPak
	ATF-54143	3/60	2	16.6	20.4	36.2	0.5	E-pHEMT FET, SOT343
WiFi	AFEM-5105		5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm			Small Size 3.2x3.2x0.6	
	AFEM-5106		5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm			Small Size 3.2x3.2x0.6	

Note:

- Gain and P1dB performance for discrete FETs when matched for best IP3.
- Current adjustable: 10 - 80mA.

Wireless Infrastructure

2-6 GHz Systems (including 802.11 a/b/g and 802.16)

2-6 GHz Systems Suggested Components

Application	Part Number	Typical Performance						Package
		Test Bias V/ mA	Test Freq. GHz	Gain1 dB	P1dB ¹ dBm	OIP3 dBm	NF dB	
RF Amplifier	MGA-61563 ³	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
Buffer Amplifier	ABA-31563	3/14	2	21.5	2.2	13.1	3.8	Si MMIC, SOT363
	ABA-51563	5/18	2	21.5	1.8	11.4	3.7	Si MMIC, SOT363
	ABA-52563	5/35	2	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-53563	5/46	2	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-54563	5/79	2	23	16.1	27.8	4.4	Si MMIC, SOT363
	MGA-565P8 ⁴	5/67	2	21.8	20 (Psat)			E-pHEMT MMIC, LPCC
	MGA-61563 ³	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. Current adjustable: 10 - 80mA.
3. Current adjustable 10 - 60mA.
4. High reverse isolation: 50dB typical.

Application	Part Number	Test Bias	Test Freq.	Gain ¹	P1dB ¹	OIP3	NF	Package (mm)
Low Noise Amplifiers	MGA-14516	5.0/45	1.95	31.7	23.5	38	0.68	QFN 4x4x0.85
	MGA-61563 ²	3/41	2	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	MGA-632P8	4/60	1.95	17.6	18.3	35.4	0.6	LPCC 2x2
	MGA-645T6	3/7	2.4	15	9.0	22	1.1	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-655T6	3/10	3.5	14.7	12.0	20.2	1.17	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-665P8	3/20.5	5.25	16	11.4	18.2	1.45	E-pHEMT MMIC, LPCC
	MGA-675T6	3.0/10	5.5	17.8	(-10) IP1dB	(-3) IIP3	1.75	E-pHEMT, UTSLP 2x1.3x0.4
	MGA-64606	3/7	2.4	15.3	-3.0 (IP1dB)	20.3	0.95	UTSLP 2.0x1.3
	MGA-65606	3/7	3.5	15.3	-2.4 (IP1dB)	21	1.05	UTSLP 2.0x1.3
	MGA-71543 ³	2.4/10	2.01	15.9	7.4	18.9	1.1	pHEMT MMIC, SOT343
	MGA-85563	3/15	2	19	0.9	11.5	1.85	pHEMT MMIC, SOT363
	MGA-87563	3/4.5	2	14	-2	8	1.8	pHEMT MMIC, SOT363
	ATF-36163	1.5	12	10	5		1.2	pHEMT FET, SOT363
	ATF-551M4	2.7/10	2	17.5	14.6	24.1	0.5	E-pHEMT FET, MiniPak
	ATF-55143	2.7/10	2	17.7	14.4	24.2	0.6	E-pHEMT FET, SOT343
	ALM-2812	3.3/15	2.45	16.7	(-5.8) IP1dB	6.1 IIP3	0.8	MCOB 3x3x1.1
			5.5	23.2	(-12.8) IP1dB	(-2.1) IIP3	1.4	MCOB 3x3x1.1
	VMMK-1218	3/20	10	10.7	12	12	0.7	SM 1x0.5
	VMMK-1225	2/20	12	11	8	23	0.9	SM 1x0.5

Notes

1. Gain and P1dB performance for discrete FETs when matched for best IP3
2. Current adjustable 10 - 60mA
3. Source grounded configuration

Wireless Infrastructure

2-6 GHz Systems (including 802.11 a/b/g and 802.16)

2-6 GHz Systems Suggested Components

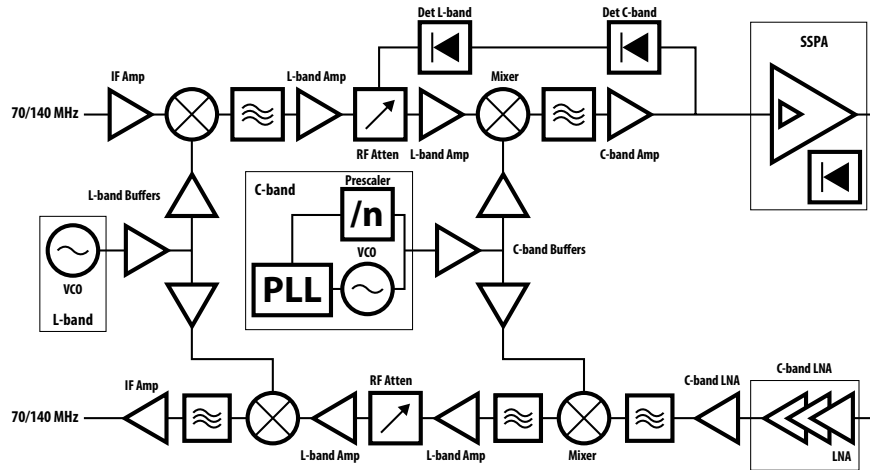
Application	Part Number	Ct max @0V	Package
Detector	HMPS-282x	1pF	Schottky, MiniPak
	HSMS-282x	1pF	Schottky, SOT323/363/23/143
	HSMS-286x	0.3pF	Schottky, SOT323/363/23/143
Switch	HMPP-389x	0.35pF	PIN, MiniPak
	HSMP-389x/489x	0.4pF	SOT323/363/23/143
	HMPP-386x	0.2pF	PIN, MiniPak
	HSMP-386x	0.2pF	SOT323/363/23/25

Application	Part Number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
IF Amplifier	MGA-62563 ¹	3/55	0.1 - 3	22	18	35	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.3	16.9	29	4.5	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.5	17.1	34	4.2	Si MMIC, SOT343
	ADA-4643	(3.5)/35	DC - 2.5	17.3	14	29	4	Si MMIC, SOT343
	ADA-4543	(3.4)/15	DC - 2.5	15.5	2.4	15	3.7	Si MMIC, SOT343
	ABA-54563	5/81	DC - 3	23	18	32	3	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363
	AVT-50663	5/36	DC - 6000	15.3	12.5	25	4	SOT-363 (SC70)
	AVT-51663	5/37	DC - 6000	19.6	12.9	25.1	3.2	SOT-363 (SC70)
	AVT-52663	5/45	DC - 6000	15.3	12.7	27	4	SOT-363 (SC70)
	AVT-53663	5/48	DC - 6000	19.6	15.1	26.5	3.2	SOT-363 (SC70)

Notes

1. Current adjustable 20 - 60mA

C-Band



Tx/GHz: 5.880-6.425, 5.725-6.275, 6.725-7.025, 6.425-6.725
 Rx/GHz: 3.625-4.200, 3.400-3.950, 4.500-4.800, 3.400-3.700

VSAT Suggested Components

Application	Part number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB @ 500MHz	P1dB/dBm @ 500MHz	OIP3/dBm @ 500MHz	NF/dB @ 500MHz	Device Type and Package
IF Amplifier	MGA-62563 ¹	3/55	0.1 - 3	22	18	34.8	0.8	E-pHEMT MMIC, SOT363
	MGA-545P8	3.3/135	0.1 - 7	22	19	36	2	E-pHEMT MMIC, LPCC
	ADA-4789	4.1/80	DC - 2.5	17	18.8	35	4.2	Si MMIC, SOT89
	ADA-4743	(3.8)/60	DC - 2.5	16.6	17.1	34	4.2	Si MMIC, SOT343
	ABA-53563	5/46	DC - 3.5	21.5	15	27.5	2.9	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.8	12.5	28	2.7	Si MMIC, SOT363

Application	Part number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB @ 2GHz	P1dB/dBm @ 2GHz	OIP3/dBm @ 2GHz	NF/dB @ 2GHz	Device Type and Package
L-band Amplifier	MGA-53543	5/54	0.4 - 6	15.4	18.6	39.1	1.5	E-pHEMT MMIC, SOT343
L-band Buffer - Low Power	MGA-61563 ¹	3/41.6	0.1 - 6	15.5	15.1	31.7	1	E-pHEMT MMIC, SOT363
	MGA-82563	3/84	0.1 - 6	13.2	17.3	31	2.2	GaAs MMIC, SOT363
	MGA-81563	3/42	0.1 - 6	12.4	14.8	27	2.8	GaAs MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	12.7	22.9	3.5	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.5	9.8	19.9	3.3	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21.5	1.8	11.4	3.7	Si MMIC, SOT363
L-band Buffer-High Power	MGA-85563 ³	3/15 to 30	0.8 - 6	19	1 to 8	12 to 17	1.9	GaAs MMIC, SOT363
	MGA-565P8 ²	5/67	0.1 - 3.5	21.8	20 (P _{sat})	-	-	E-pHEMT MMIC, LPCC
	MGA-82563	3/84	0.1 - 6	13.2	17.3	31	2.2	GaAs MMIC, SOT363

Notes:

1. Current adjustable 10-60mA.
2. High reverse isolation: 50dB typical.
3. Reverse Isolation 40dB typical.

C-Band

VSAT Suggested Components

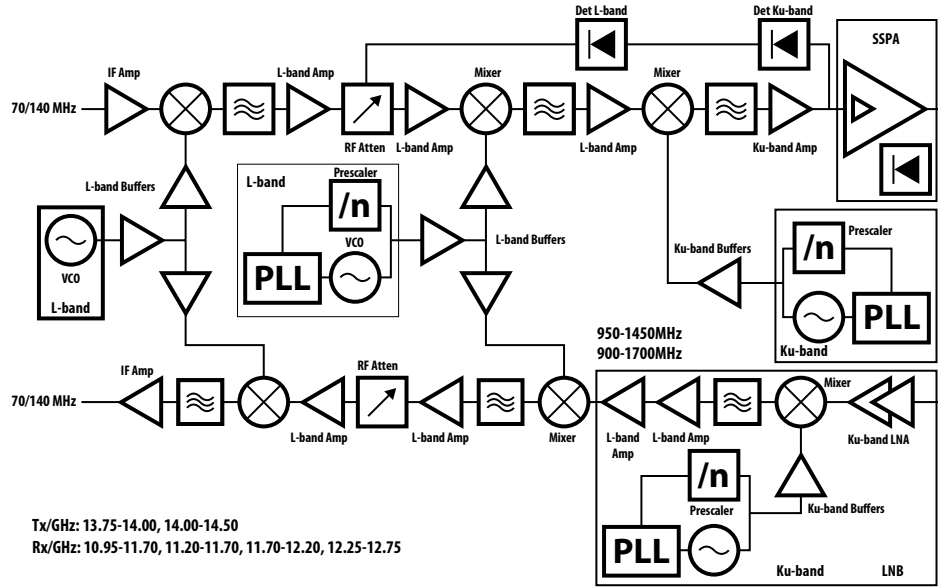
Application	Part Number	Description	Package
L-band/C-band Detector - Schottky Diodes	HSMS-282x	Ct max = 1pF @0V	SOT323/363/23/143
	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
RF Attenuator - PIN Diodes	HSMP-381x	Very low distortion, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/23/25/SOD-323
	HSMP-386x	Lower current, low cost, Ct typ. = 0.2pF @0V, see AN1048 pi-attenuator design	SOT323/363/23/25/SOD-323
RF Attenuator - Module	ALM-38140	Low distortion, high dynamic range attenuator module	MCOB 3.8x3.8x1.0mm

Application	Part number	Typ. Bias V/ mA	Frequency Range/ GHz	Gain/dB ¹ @ 5GHz	P1 dB/dBm ¹ @ 5GHz	OIP3/dBm @ 5GHz	NF/dB ² @ 5GHz	Device Type and Package
C-band LNA	ATF-36163	1.5/10	1.5 - 18	15	5	–	0.61	PHEMT FET, SOT363
	ATF-551M4	2.7/10	0.5 - 6	12	14.5	24.5	0.75	E-pHEMT FET, MiniPak
	ATF-55143	2.7/10	0.5 - 6	12	13.5	24	0.9	E-pHEMT FET, SOT343
C-band Amplifier C-band Buffer	MGA-545P8	3.3/135	0.1 - 6	12	21	34	3.6	E-pHEMT MMIC, LPCC
	MGA-82563	3/84	0.1 - 6	9.5	17	31	2.6	GaAs MMIC, SOT363
	MGA-81563	3/42	0.1 - 6	10.5	14.5	27	3.2	GaAs MMIC, SOT363
	MGA-85563	3/15 to 30	0.8 - 6	16	1 to 8	12 to 18	1.6	GaAs MMIC, SOT363
	ATF-541M4	3/60	0.5 - 8	11	19.5	37.5	1.02	E-pHEMT FET, MiniPak
	ATF-54143	3/60	0.5 - 6	11	18	36	0.93	E-pHEMT FET, SOT343
	ATF-521P8	4.5/200	0.5 - 6	10	27	39	1.75	E-pHEMT FET, LPCC

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3
2. NFmin figures for discrete FETs

Ku-Band



VSAT Suggested Components

Application	Part number	Typ. Bias V/ mA	Frequency Range/ GHz	Gain/dB ¹ @ 12GHz	P1dB/dBm ¹ @ 12GHz	OIP3/dBm @ 12GHz	NF/dB ² @ 12GHz	Device Type and Package (mm)
Ku-band LNA	ATF-36163	1.5/10	1.5 - 18	9.4	5	-	1	PHEMT FET, SOT363
	AMMP-6220	3/60	6 - 20	23	10	23	2.2	SM 5x5
	VMMK-1225	2/20	0.5 - 26	11	8	23	0.9	SM 1x0.5
	VMMK-1218	3/20	0.5 - 18	10.7	12	12	0.7	SM 1x0.5
Ku-band Amplifier	AMMP-5618	5/107	6 - 20	13	19	30	4.4	SM 5x5
Ku-band Buffer	AMMP-6408	5/650	6 - 18	18	28	38	4.5	SM 5x5
Ku-band Mixer (IRM)	AMMP-6530	-1/0	5 - 30	-10	8	18	10	SM 5x5

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best noise.
2. NFmin figures for discrete FETs.

Ku-Band

VSAT Suggested Components

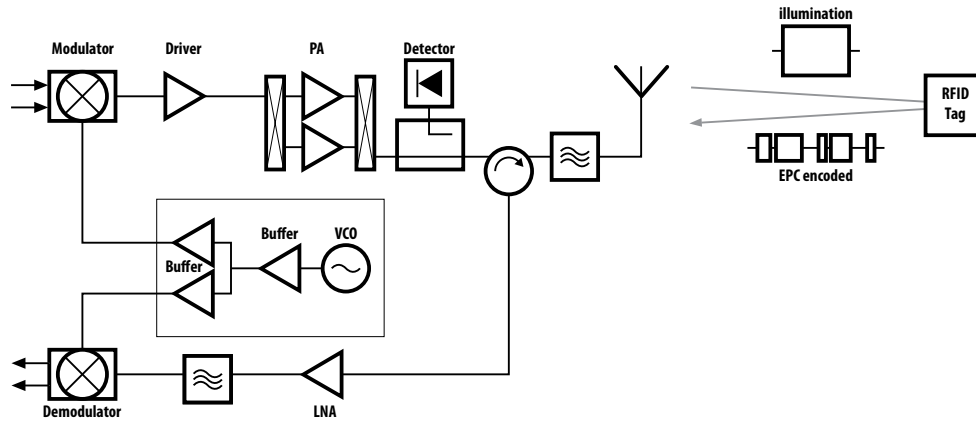
Application	Part Number	Description	Package
Ku-band Detector - Schottky diodes	HSMS-286x	Ct max = 0.3pF @0V	SOT323/363/23/143
	HSCH-5310/5330	Si single, Ct=0.1pF, med. barrier/low barrier	beamlead
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	beamlead
Ku-band Mixer - Schottky diodes	HSMS-8202	Si series pair, Ct=0.26pF, low-cost	SOT23
	HSCH-5312/5332	Si single Ct=0.15pF, med. barrier/low barrier	beamlead

Ka-Band

VSAT/Block Converter

Application	Part number	Typ. Bias (V/mA)	Frequency Range/(GHz)	Gain/(dB) @ 30 GHz	P1dB/(dBm) @ 30 GHz	OIP3/(dBm) @ 30 GHz	NF/(dB) @ 30 GHz	Device Type and Package (mm)
Ka-band LNA/ Driver	AMMP-6232	4/135	18 - 32	22	18	28.5	3.1	SM 5x5
	AMMP-6233	3/65	18 - 32	21	8	21	2.8	SM 5x5
	AMMP-6333	5/230	18 - 33	22	24.5	30	–	SM 5x5
Ka-Band Power Amplifier	AMMP-6430	5/650	27 - 34	20	28	34	7.8	SM 5x5
	AMGP-6432	6/700	28 - 31	20	33	40	–	SM 5x5
	AMGP-6434	6/1400	28 - 31	20	35.5	42	–	SM 5x5
Ka-Band Mixer	AMMP-6545	–	RF: 18 - 40/ IF: DC - 3.5	-8	–	12 (IIP3)	–	SM 5x5
	AMMP-6546	–	RF: 18 - 40/ IF: DC - 3.5	-10	–	12 (IIP3)	–	SM 5x5
Ka-Band VVA	AMMP-6630	–	5 - 30	-3.5	–	25 (IIP3)	–	SM 5x5
Ka-Band Multiplier	AMMP-6125	3.5/5V @ 100/110	10 - 24	22	22 (Pout)	–	–	SM 5x5
	AMMP-6120	5/112	8 - 24	13	18 (Pout)	–	–	SM 5x5
Ka-Detector	VMMK-3313	1.5/0.15	15 - 33	–	–	–	–	SM 1x0.5x0.25

RFID 900 MHz Reader



RFID 900MHz Reader Suggested Components

Application	Part number	Typ. Bias V/ mA	Frequency Range/GHz	Gain/dB ¹ @ 0.9GHz	P1dB/dBm ¹ @ 0.9GHz	OIP3/dBm @ 0.9GHz	NF/dB ² @ 0.9GHz	Device Type and Package (mm)
LNA	MGA-53543	5/54	0.4 - 6	17.4	19.3	39.7	1.3	E-pHEMT MMIC, SOT343
	MGA-72543 ³	3/20	0.1 - 6	14.8	12	23	1.35	E-pHEMT MMIC, SOT343
	ATF-54143	3/60	0.45 - 6	23.4	18.4	35.5	0.3	E-pHEMT FET, SOT343
	ATF-58143	3/30	0.45 - 6	23.1	18.1	28.6	0.3	E-pHEMT FET, SOT343
Driver Amplifier	MGA-53543	5/54	0.4 - 6	17.4	19.3	39.7	1.3	E-pHEMT MMIC, SOT343
	MGA-545P8	3.3/127	0.05 - 7	22.4	21.5	34	2.6	E-pHEMT MMIC, LPCC
	MGA-61563 ⁴	3/41	0.1 - 6	19.3	15.4	30.5	0.9	E-pHEMT MMIC, SOT363
	ATF-52189	4.5/200	0.05 - 6	16.5	27.2	42	1	E-pHEMT FET, SOT89
	ATF-521P8	4.5/200	0.05 - 6	17.2	26.5	42.5	0.7	E-pHEMT FET, LPCC
	ATF-53189	4/135	0.05 - 6	17.2	21.7	42	0.41	E-pHEMT FET, SOT89
	ATF-531P8	4/135	0.05 - 6	25	23	37	0.26	E-pHEMT FET, LPCC
	ADA-4789	4.1/80	DC - 2.5	16.9	18.8	33.2	4.3	Si MMIC, SOT89
ADA-4743	3.8/60	DC - 2.5	16.5	17.1	32.6	4.2	Si MMIC, SOT343	
Power Amplifier	ATF-50189	4.5/280	0.05 - 6	21.5	28.5	44	1	E-pHEMT FET, SOT89
	ATF-501P8	4.5/280	0.05 - 6	16.6	27.3	42	1	E-pHEMT FET, LPCC
	ATF-511P8	4.5/200	0.05 - 6	17.8	29.6	43	1.2	E-pHEMT FET, LPCC
Mixer	IAM-92516	5/26	0.4 - 3.5	6.5 (CL)	16 (IP1dB)	29.3 (IIP3)	7.1	E-pHEMT MMIC, LPCC(3x3)
Buffer-High Power	MGA-565P8 ⁵	5/67	0.1 - 3.5	28	22 (Psat)	—	—	E-pHEMT MMIC, LPCC
	ABA-54563	5/79	DC - 3.4	23	18	34	4.2	Si MMIC, SOT363
Buffer-Low Power	ABA-31563	3/14	DC - 3.5	21.3	3	15	3.8	Si MMIC, SOT363
	ABA-51563	5/18	DC - 3.5	21	3.5	15	3.4	Si MMIC, SOT363
	ABA-52563	5/35	DC - 3.5	21.3	12	26	2.9	Si MMIC, SOT363
	ABA-53563	5/46	DC - 3.5	21.5	14.5	26.5	3.1	Si MMIC, SOT363
Detector	HSMS-282x	Ct max = 1pF @0V						SOT323/363/23/143

Notes:

1. Gain and P1dB performance for discrete FETs when matched for best IP3.
2. NFmin figures for discrete FETs.
3. High reverse isolation: 50dB typical.
4. Current adjustable: 20-60mA.
5. Includes integral bypass function. Current adjustable between 5 – 60mA.

Product Selection Guides

RFICs (GaAs and Silicon)

GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
GaAs Fixed Gain Amplifiers	MGA-52543	0.4 - 6	1.9	5	53	1.9	14.2	+17.4	+32	SOT-343 (SC-70)
	MGA-53543	0.4 - 6	1.9	5	54	1.5	15.4	+18.6	+39	SOT-343 (SC-70)
	MGA-53589	0.05 - 6	1.9	5	52	1.66	15.8	+18.5	+37	SOT-89
	MGA-81563	0.1 - 6	2.0	3	42	2.8	12.4	+14.8	+27	SOT-363 (SC-70)
	MGA-82563	0.1 - 6	2.0	3	84	2.2	13.2	+17.3	+31	SOT-363 (SC-70)
	MGA-85563	0.8 - 6	2.0	3	15 to 30	1.9	18.0	+1 to +8	+12 to +17	SOT-363 (SC-70)
	MGA-86563	0.5 - 6	2.0	5	14	1.5	22.7	+4.1	+15	SOT-363 (SC-70)
	MGA-87563	0.5 - 4	2.0	3	4.5	1.6	14.0	-2	+8	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idsat (mA)	PAE (%)	Gain (dB)	PSAT (dBm)	OIP3 (dBm)	Package (mm)
GaAs Medium Power Amplifiers	MGA-30789	2 - 6	3.5	5	100		11.7	–	41.8	SOT-89
	MGA-30889	0.04 - 2.6	0.9	5	65		15.5	–	38	SOT-89
	MGA-30989	2 - 6	3.5	5	51		12	–	36.8	SOT-89
	MGA-412P8	2.4 - 2.5	2.4	3.3	95	NA	25.5	+25.3	38	LPCC 2X2
	MGA-425P8	2 - 10	5.25	3.3	65	47.0	16.0	+20.3	32.9	LPCC 2x2
	MGA-545P8	0.05 - 7	5.825	3.3	92	46.0	11.5	+22	+34	LPCC 2x2
	MGA-83563	0.5 - 6	2.4	3	152	37.0	22.0	+22	+29	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	OP1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs Match-Pair Dual LNA	MGA-16116	0.45-1.45	0.9	4.8	61	0.27	18.4	21.2	21.2 (IIP3)	QFN 4x4x0.85
	MGA-16216	1.44-2.35	1.95	4.8	52.5	0.32	18.4	19.5	19.5 (IIP3)	QFN 4x4x0.85
	MGA-16316	1.95-4.0	2.6	4.8	53.3	0.45	18.2	18.7	15.5 (IIP3)	QFN 4x4x0.85

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs Smart Bias Amplifier	MGA-61563	0.1 - 6	2	3	41	1.2	16.6	+15.8	+28.5	SOT-363 (SC-70)
	MGA-62563	0.1 - 3	0.5	3	60	0.9	22.0	+17.8	+32.9	SOT-363 (SC-70)
	MGA-685T6	0.1 - 1.5	0.5	3	10	0.9	18.9	17.3	+18.7	UTSLP 2.0x1.3x0.4
	MGA-68563	0.1 - 1.5	0.5	3	11	1	19.7	17.5	20.7	SOT-363

RFICs (GaAs and Silicon)

GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	PAE (%)	OIP3 (dBm)	Package (mm)
GaAs High Linearity Amplifier	ALM-31122	0.7 - 1	0.9	5	394	2	15.6	52.5	47.6	MCOB 5.0x6.0x1.1
	ALM-31222	1.7 - 2.7	2	5	415	2.7	14.9	52.6	47.9	MCOB 5.0x6.0x1.1
	ALM-31322	3.3 - 3.9	3.5	5	413	2.8	13.2	51.5	47.7	MCOB 5.0x6.0x1.1
	ALM-32120	0.7 - 1.0	0.9	5	800	2.5	14	47	52	MCOB 7.0x10.0x1.1
	ALM-32220	1.7 - 2.7	2	5	800	3.5	14.8	47.5	50	MCOB 7.0x10.0x1.1
	ALM-32320	3.3 - 3.9	3.5	5	800	2.5	12	43	49	MCOB 7.0x10.0x1.1
	MGA-30116	0.75 - 1	0.9	5	202.8	2	17	47	44.1	QFN 3x3
	MGA-30216	1.7 - 2.7	2	5	206	2.8	14.2	48.9	45.3	QFN 3x3
	MGA-30316	3.3 - 3.9	3.5	5	198	2.7	12.8	51.3	44.4	QFN 3x3
	MGA-30489	0.25 - 3.0	1.9	5	97	3	13.3	–	39	SOT-89
	MGA-30689	0.04 - 2.6	1.95	5	104	3.3	14.6	–	40	SOT-89
	MGA-31189	0.05 - 2	0.9	5	111	3	21	42.5	42	SOT-89
	MGA-31289	1.5 - 3	1.9	5	124	2	18.7	36.4	41.8	SOT-89
	MGA-31389	0.05 - 2	0.9	5	73	2	21.3	41.2	38.6	SOT-89
	MGA-31489	1.5 - 3	1.9	5	69	1.9	19.5	39.1	37.3	SOT-89
	MGA-31589	0.45 - 1.5	0.9	5	146	1.9	20.4	45	45.3	SOT-89
	MGA-31689	1.5 - 3	1.9	5	168	1.9	18.1	48	44.9	SOT-89
	MGA-31716	DC - 2	0.9	5	58	1.9	20.2	43.9	41	QFN 3x3
MGA-31816	1.5 - 4.0	1.9	5	59	1.6	19.5	38.2	40.5	QFN 3x3	

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idsat (mA)	Isolation (dB)	Gain (dB)	Psat (dBm)	Package (mm)
GaAs LO Buffer Amplifier	MGA-565P8	0.1 - 3	2	5	67	50.0	21.8	+20	LPCC2x2

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd/Id (V/mA)	Switch Insertion Loss (dB)	NF (dB)	Gain (dB)	P1dB (dBm @ mA)	IIP3 (dBm @mA)	Package (mm)
GaAs Amplifier with Bypass Switch	MGA-645T6	1.7 - 3	2.4	3/7	4.5	1.1	15.0	+9 @ 7	+7 @ 7	UTSLP 2.0x1.3x0.4
	MGA-64606	1.5 - 3	2.4	3/7	4.5	0.95	15.3	-3.0(IP1dB)	+5@7	UTSLP 2.0x1.3
	MGA-655T6	2.5 - 4	3.5	3/10	4.2	1.17	14.7	+12 @ 10	+5.5 @ 10	UTSLP 2.0x1.3x0.4
	MGA-65606	2.5 - 4	3.5	3/7	4.2	1.05	15.3	-2.4(IP1dB)	+5.7@7	UTSLP 2.0x1.3
	MGA-71543	0.1 - 6	2	2.7/10	5.6	0.8	15.4	+7.4 @ 10	+3 @ 10	SOT-343 (SC-70)
	MGA-72543	0.1 - 6	2	2.7/20	2.5	1.4	13.6	+11.2 @ 20	+10.5 @ 20	SOT-343 (SC-70)
	MGA-725M4	0.1 - 6	2	2.7/20	1.6	1.3	15.7	+13.1 @ 20	+9.9 @ 20	MiniPak Package
	MGA-785T6	0.1 - 1.5	0.6	3/10	2.6	1.5	15.7	3.2 @ 10	+1.10 @ 10	UTSLP 2.0x1.3x0.4

RFICs (GaAs and Silicon)

GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs LNA with Power Down	MGA-665P8	0.5 - 6	5.25	3	21	1.5	16.5	11.1	15.4	LPCC2x2
GaAs LNA Module	MGA-13116	0.4 - 1.5	0.9	5	55	0.51	38	23.3	41.4	QFN 4x4x0.85
	MGA-13216	1.5 - 2.5	1.95	5	53	0.61	35.8	23.6	40.5	QFN 4x4x0.85
	MGA-13316	2.2 - 4.0	2.5	5	53	0.76	34.3	23.5	41.8	QFN 4x4x0.85
	MGA-14516	1.4 - 2.7	1.95	5	45	0.66	31.7	23.5	38	QFN 4x4x0.85
	MGA-231T6	0.9 - 3.5	1.575	2.7	6	0.9	18.5	(-8) IP1dB	2 (IIP3)	E-pHEMT, UTSLP 2x1.3x.04
	MGA-24106	0.9 - 3.5	1.575	2.7	3.3	0.97	17.9	-9.7 (IP1dB)	-2.0 (IIP3)	uDFN 1.5x1.3x0.5
	MGA-631P8	0.4 - 1.5	0.9	4	60	0.5	17.5	18	32.8	LPCC2x2
	MGA-632P8	1.4 - 3	1.95	4	60	0.6	17.6	18.3	35.4	LPCC2x2
	MGA-633P8	0.45 - 2	0.9	5	54	0.37	18	22	37	QFN 2x2x0.75
	MGA-634P8	1.5 - 2.3	1.9	5	48	0.44	17.4		36	QFN 2x2x0.75
	MGA-635P8	2.3 - 4	2.5	5	56	0.56	18	21.9	35.9	QFN 2x2x0.75
	MGA-636P8	0.45 - 1.5	0.7	4.8	105	0.5	18.5	23	41.5	QFN 2x2x0.75
	MGA-637P8	1.5 - 2.5	1.7	4.8	70	0.6	17.5	22	41.5	QFN 2x2x0.75
	MGA-638P8	2.5 - 4	2.5	4.8	90	0.8	17.5	22	39.5	QFN 2x2x0.75
	MGA-635T6	0.9 - 2.4	1.575	2.85	4.9	0.86	14.6	1 (IP1dB)	3.5 (IIP3)	UTSLP 2.0x1.3x0.4
	MGA-675T6	4.9 - 6.0	5.5	2.7	5	0.9	16.3	NA	14.7	UTSLP
	ALM-11036	0.776 - 0.87	0.849	5	92	0.78	15.6	4	37.6	SMT 7x10
	ALM-11136	0.87 - 0.915	0.915	5	92	0.76	15.4	4.5	38.2	SMT 7x10
	ALM-11236	1.71 - 1.85	1.785	5	99	0.67	15.9	3.5	32.3	SMT 7x10
	ALM-11336	1.85 - 1.98	1.98	5	100	0.72	15.3	3.8	35.5	SMT 7x10
ALM-2506	0.9 - 2.5	1.575	2.85	8	0.8	14.3	1.9 (IP1dB)	4.7 (IIP3)	MCOB 2x2x1.1	

Component	Part Number	Test Freq. (GHz)	Vd/Id (V/mA)	NF (dB)	Gain (dB)	IP1dB (dBm)	IIP3 (dBm)	Cell-Band Rejection	PCS-Band Rejection	Package (mm)
GPS LNA/Filter Module	ALM-1612	1.575	2.7/6	0.95	18.2	-8	2	69	67	MCOB 3.3x2.1x1.0
	ALM-1912	1.575	2.7/6	1.62	19.3	-8	1.5	>57	>53	MCOB 2.9x2x1
	ALM-2412	1.575	2.85/9	0.85	13.5	2.2	6.1	63	65	MCOB 3.3x2.1x1.1
GPS Filter/LNA/Filter Module	ALM-1712	1.575	2.7/8	1.65	12.8	3	3	104	92.6	E-pHEMT & FBAR, MCOB 4.5x2.2x1.0
	ALM-1812	1.575	2.8/6	1.9	18.5	-8	2	95	90	E-pHEMT & FBAR, MCOB 4.5x2.2x1.0
	ALM-2712	1.575	2.7/7.5	12.6	14.2	5	2	-	-	MCOB 3x2.5x1

RFICs (GaAs and Silicon)

GaAs RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	NF (dB)	Gain (dB)	OIP3 (dBm)	P1dB (dBm)	Package (mm)
Variable Gain Amplifier	ALM-80110	0.4 - 1.6	0.9	5	110	4.8	(-27) to 13.6	40.3	23.3	MCOB 5.0x5.0x1.1
	ALM-80210	1.6 - 2.6	1.9	5	110	5.3	(-25.5) to 9.8	40.8	23.6	MCOB 5.0x5.0x1.1
	ALM-81224	1.45 - 2.75	2.14	5	383	2	23.8	44	27.4	MCOB 6.0x6.0x1.0

	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (Vdg)	Current (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
Mixers-Downconverter	IAM-92516	0.4 - 3.5	1.9	5	26	12.5	-6.0	9	27 (IIP3)	LPCC 3x3

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	Gain (dB)	P1dB (dB)	Pout @ 2.5% EVM	Atten (dB)	Package (mm)
GaAs Power Amplifier Module	MGA-43228	2.3 - 2.5	2.4	5	1023	38.5	36	29.1	23.8	QFN 5x5
	MGA-43328	2.5 - 2.7	2.6	5	1017	37.4	36	29.3	24.5	QFN 5x5
	MGA-43428	851-894MHz	0.88	5	800	>30	36	27dBm@50dBc ACLR	-	MCOB 5x5
	MGA-43528	1.93 - 1.995	1.96	5	1000	>30	35	27dBm@50dBc ACLR	-	MCOB 5x5
	MGA-43628	2.0 - 2.2	2.14	5	1000	>30	35	27dBm@50dBc ACLR	-	MCOB 5x5
	MGA-43728	2.62-2.69	2.65	5	755	38.3	36	27.3dBm@48dBc ACLR	-	MCOB 5x5
	MGA-43828	0.925-0.960	0.94	5	730	32.8	36	27.5dBm@50dBc ACLR	-	MCOB 5x5
	MGA-43003	1.805-1.88	1.842	5	360	41.7	36	27dBm@48dBc ACLR	-	MCOB 5x5
	MGA-43040	2.3-2.4	2.35	5	350	42	35	27 dBm@48dBc ACLR	-	MCOB 5x5
	MGA-43013	728-756 MHz	0.746	5	380	34	36	27 dBm@48dBc ACLR	-	MCOB 5x5
Carrier Grade WiFi	MGA-43024	2401-2473MHz	2.442	5	450	40.8	34	26.8	-	MCOB 5x5

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	BCTRL	Gain (dB)	PAE of 19%	IP1dB (dBm)	Package (mm)	
WiFi Amplifier Module	MGA-22003	2.3 - 2.7	2.5	2.8	35	19	31	Small Size 3x3x1	
	MGA-23003	3.3 - 3.8	3.5	2.8	35	18	31	Small Size 3x3x1	
	MGA-25203	5.1 - 5.9	5.4	2.8	30	13	30	Small Size 3x3x1	
	AFEM-5105	5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm						Small Size 3.2x3.2x0.6
	AFEM-5106	5.1 - 5.9	EVM <-32.5dB at 15dBm, <-35dB at 12dBm						Small Size 3.2x3.2x0.6

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd (V)	Idq (mA)	NF (dB)	Gain (dB)	IIP3 (dBm)	IP1dB (dBm)	Package (mm)
WiFi Dual Band LNA Module	ALM-2812	2.4 - 2.5	2.45	3.3	15	0.8	16.7	6.1	5.8	MCOB 3.0x3.0x1.1
		4.9 - 6.0	5.5	3.3	23.4	1.4	23.2	2.2	12.8	MCOB 3.0x3.0x1.1

RFICs (GaAs and Silicon)

InGaP HBT

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	Gain (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
Gain Block	AVT-50663	DC - 6000	2	5	36	15.3	4	12.5	25	SOT-363 (SC70)
	AVT-51663	DC - 6000	2	5	37	19.6	3.2	12.9	25.1	SOT-363 (SC70)
	AVT-52663	DC - 6000	2	5	45	15.3	4	12.7	27	SOT-363 (SC70)
	AVT-53663	DC - 6000	2	5	48	19.6	3.2	15.1	26.5	SOT-363 (SC70)
	AVT-54689	0.05 - 6	2	5	58	17.1	4.1	17.4	29.6	SOT-89
	AVT-55689	0.05 - 6	2	5	75	17.2	4.3	19.5	32.5	SOT-89

Silicon RFICs

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (Vdg)	Current (mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package
Silicon Broadband Amplifiers	ABA-31563	DC - 3.5	2.0	3	14.5	3.8	21.0	+2.0	13.0	SOT-363 (SC-70)
	ABA-51563	DC - 3.5	2.0	5	18	3.7	21.5	+1.8	11.4	SOT-363 (SC-70)
	ABA-52563	DC - 3.5	2.0	5	35	3.3	21.5	+9.8	19.9	SOT-363 (SC-70)
	ABA-53563	DC - 3.5	2.0	5	46	3.5	21.5	+12.7	22.9	SOT-363 (SC-70)
	ABA-54563	DC - 3	2.0	5	79	4.4	23.0	+16.1	27.8	SOT-363 (SC-70)
Silicon Darlington Amplifiers	ADA-4543	DC - 2.5	0.9	3.4	15	3.7	15.1	+1.9	15.0	SOT-343 (SC-70)
	ADA-4643	DC - 2.5	0.9	3.5	35	4.0	17.0	+13.4	28.3	SOT-343 (SC-70)
	ADA-4743	DC - 2.5	0.9	3.8	60	4.2	16.5	+17.1	32.6	SOT-343 (SC-70)
	ADA-4789	DC - 2.5	0.9	3.8	60	4.2	16.5	+17.1	32.6	SOT-89

RFICs (GaAs and Silicon)

Minituraized Surface Mouted Package RF Component “0402 Size RF Component”

Component	Part Number	Freq. Range (GHz)	Vd (V)/ Idq (mA)	NF (dB)	Gain (dB)	OIP3 (dBm)	P1dB (dBm)	Package (mm)
Low Noise E-PHEMT	VMMK-1218	0.5 - 18	3/20	0.8 @ 10 GHz	10.7 @ 12 GHz	22@10 GHz	12 @ 10 GHz	SM 1x0.5x0.25
	VMMK-1225	0.5 - 26	2/20	1 @ 12 GHz	11 @ 12 GHz	23 @ 12 GHz	8 @ 12 GHz	SM 1x0.5x0.25

Component	Part Number	Freq. Range (GHz)	Biasing Condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
Low Noise Amplifier	VMMK-2103	0.5 - 6	5/23	2.1	14	0 (IP1dB)	8 (IIP3)	SM 1x0.5x0.25
	VMMK-2203	1 - 10	5/25	2	16.5	5	14	SM 1x0.5x0.25
	VMMK-2303	0.5 - 6	1.8/21	2	14	9	22	SM 1x0.5x0.25
	VMMK-2403	2 - 4	3/37	1.7	16	16.5	28	SM 1x0.5x0.25
	VMMK-3603	1 - 6	5/36	1.5	16.8	12	25	SM 1x0.5x0.25
	VMMK-3803	3 - 11	3/20	1.5	20	7	0.9 (IIP3)	SM 1x0.5x0.25

Component	Part Number	Freq. Range (GHz)	Biasing Condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
Gain Block/ Driver Amplifier	VMMK-2503	1 - 12	5/65	3.4	13.5	17	27	SM 1x0.5x0.25

Component	Part Number	Freq. Range (GHz)	Biasing Condition (V @ mA)	Control Range (dB)	Max. Gain (dB)	Control Voltage (V)	IIP3 (dBm)	Package (mm)
Variable Gain Amplifier	VMMK-3503	0.5 - 18	5/58	23	12	0.65 - 1.8	9 @ 6 GHz	SM 1x0.5x0.25

Component	Part Number	Freq. Range (GHz)	Biasing Condition (V @ mA)	In/Out R.L (dB)	Insertion loss (dB)	Dynamic Range (dB)	Directivity (dB)	Package (mm)
Power Detector	VMMK-3113	2 - 6	1.5V@ 0.15mA	20	0.2 - 0.35	35	15	SM 1x0.5x0.25
	VMMK-3213	6 - 18	1.5V@ 0.15mA	20	0.15 - 0.5	35	15	SM 1x0.5x0.25
	VMMK-3313	15 - 33	1.5V@ 0.15mA	20	0.25 - 0.7	35	15	SM 1x0.5x0.25
	VMMK-3413	25 - 45	1.5V@ 0.15mA	20	0.4 - 0.8	35	10	SM 1x0.5x0.25

Transistors

Transistors

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Voltage (V)	NF (dB)	Gain (dB)	P1dB (dBm)	S21E (dB)	OIP3 (dBm)	Package
Silicon Bipolar Transistor	AT-30511	DC - 5	0.9	2.7	1.1	16.0	+7.0	17.9	17.0	SOT-143
	AT-30533	DC - 5	0.9	2.7	1.1	13.0	+7.0	15.2	17.0	SOT-23
	AT-31011	DC - 5	0.9	2.7	0.9	13.0	+9.0	19.1	20.0	SOT-143
	AT-31033	DC - 5	0.9	2.7	0.9	11.0	+9.0	15.8	20.0	SOT-23
	AT-32011	DC - 5	0.9	2.7	1.0	14.0	+13.0	18.9	24.0	SOT-143
	AT-32032	DC - 6	0.9	2.7	1.0	15.0	+13.0	11.5	23.0	SOT-323
	AT-32033	DC - 5	0.9	2.7	1.0	12.5	+13.0	15.1	24.0	SOT-23
	AT-32063	DC - 5	0.9	2.7	1.1	14.5	+12.0	17.0	24.0	SOT-363 (SC-70)

Component	Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vdd / Idq (V)	NF (dB)	Ga (dB)	P1dB (dBm)	OIP3 (dBm)	Gate Width (um)	Package (mm)
Single Voltage Low Noise GaAs E-pHEMTs	ATF-501P8	.05 - 6	2	4.5/280	1.8	14.6	+28	+47	6400	LPCC 2x2
	ATF-50189	.05 - 6	2	4.5/280	1.1	15.5	+29.1	+45.3	6400	SOT-89
	ATF-511P8	.05 - 6	2	4.5/200	1.4	14.8	+30	+42	6400	LPCC 2x2
	ATF-521P8	05 - 6	2	4.5/200	1.5	17.0	+26.5	+42	3200	LPCC 2x2
	ATF-52189	05 - 6	2	4.5/200	1.5	16.0	+27.0	+42	3200	SOT-89
	ATF-531P8	05 - 6	2	4.0/135	0.6	20.0	+24.5	+38	1600	LPCC 2x2
	ATF-53189	05 - 6	2	4.0/135	0.85	15.5	+23.0	+40	1600	SOT-89
	ATF-54143	.45 - 6	2	3.0/60	0.5	16.6	+20.4	+36	800	SOT-343 (SC-70)
	ATF-541M4	.45 - 10	2	3.0/60	0.5	17.5	+21.4	+36	800	MiniPak Package
	ATF-55143	.45 - 6	2	2.7/10	0.6	17.7	+14.4	+24	400	SOT-343 (SC-70)
	ATF-551M4	.45 - 10	2	2.7/10	0.5	17.5	+14.6	+24	400	MiniPak Package
	ATF-58143	.45 - 6	2	3.0/30	0.5	16.5	+19	+30.5	800	SOT-343 (SC-70)
Low Noise GaAs pHEMTs	ATF-33143	.45 - 6	2	4.0/80	0.5	15.0	+22	+33.5	1600	SOT-343 (SC-70)
	ATF-331M4	.45 - 6	2	4.0/80	0.6	15.0	+19	+31	1600	MiniPak Package
	ATF-34143	.45 - 6	2	4.0/60	0.5	17.5	+20	+31.5	800	SOT-343 (SC-70)
	ATF-35143	.45 - 6	2	2.0/15	0.4	18.0	+11	+21	400	SOT-343 (SC-70)
	ATF-38143	.45 - 6	2	2.0/10	0.4	16.0	+12	+22	800	SOT-343 (SC-70)
	ATF-36163	1.5 - 18	12	1.5	1.2	10.0	+5	-	200	SOT-363 (SC-70)
	VMMK-1218	0.5 - 18	-	3/20	0.7	10.7	12	12	-	SM 1x0.5
	VMMK-1225	0.5 - 26	-	2/20	0.9	11	8	23	-	SM 1x0.5

Diodes — PIN

MiniPak

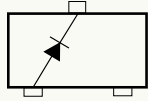
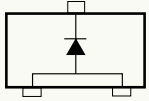
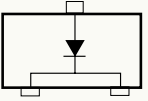
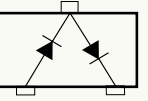
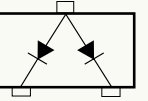
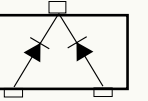
	Single	Anti-parallel	Parallel	Shunt Switch
Configuration	<p>(0)</p>	<p>(2)</p>	<p>(5)</p>	<p>(T)</p>
PIN	HMPP-3860	HMPP-3862	HMPP-3865	
	HMPP-3890	HMPP-3892	HMPP-3895	HMPP-389T

3 Lead Diodes SOT-323 (SC-70)

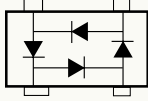
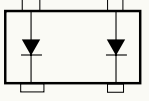
	Single	Dual Anode	Dual Cathode	Series Pair	Common Anode	Common Cathode
Configuration						
PIN	HSMP-381B		HSMP-481B	HSMP-381C	HSMP-381E	HSMP-381F
	HSMP-386B			HSMP-386C	HSMP-386E	HSMP-386F
	HSMP-389B	HSMP-489B		HSMP-389C	HSMP-389E	HSMP-389F
		HSMP-482B				

Diodes — PIN

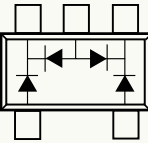
3 Lead Diodes SOT-23

	Single	Dual Anode	Dual Cathode	Series Pair	Common Anode	Common Cathode
Configuration						
PIN	HSMP-3810		HSMP-4810	HSMP-3812	HSMP-3813	HSMP-3814
	HSMP-3860			HSMP-3862	HSMP-3863	HSMP-3864
	HSMP-3890	HSMP-4890		HSMP-3892	HSMP-3893	HSMP-3894
	HSMP-3820	HSMP-4820		HSMP-3822	HSMP-3823	HSMP-3824
	HSMP-3830			HSMP-3832	HSMP-3833	HSMP-3834
				ASML-5822		
				ASML-5829		

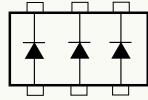
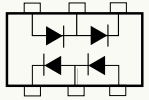
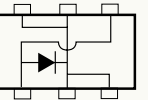
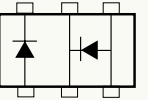
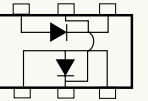
4 Lead Diodes SOT-143

	Ring Quad	Unconnected Pair
Configuration		
PIN	HSMP-386D	HSMP-3895
	HSMP-389D	

5 Lead Diodes SOT-25

	Pi Quad
Configuration	
PIN	HSMP-3816
	HSMP-3866

6 Lead Diodes SOT-363 (SC-70)

	Unconnected Trio	Dual Mode Switch	Low Inductance	Series Shunt Pair	High Frequency Series Shunt Pair
Configuration					
PIN	HSMP-386L				
	HSMP-389L	HSMP-389R	HSMP-389T	HSMP-389U	HSMP-389V

Diodes — PIN

PIN Diodes

Application	Part Number	C_t (pF) (max/typ)	R_S (Ω) (max)	V_{BR} (V) (min)	T_{rr} (nS) (typ)	Lifetime (nS) (typ)
Low Distortion Attenuator	HSMP-381x	0.35/0.27	3.0	100	300	1500
Low Distortion/Low Inductance Attenuator	HSMP-481x	0.40/0.35	3.0	100	300	1500
Low Resistance Limiter	HSMP-382x	0.8/0.6	0.6	50	7	70
Low Inductance Limiter	HSMP-482x	1.0/0.75	0.6	50	7	70
Low Current Switch/ Attenuator	HSMP-383x	0.3/0.2	1.5	200	80	500
Low Current Switch/ Attenuator	HMPP/HSMP-386x	- / 0.2	1.5 typ	50	80	500
Low Resistance Switch	HMPP/HSMP-389x	0.30/0.20	2.5	50	–	200
Low Resistance/Low Inductance Switch	HSMP-489X	0.38/0.33	2.5	50	–	200

Beam Lead PIN Diodes

Part Number	C_t (pF)	R_S (Ω)	V_{BR} (V)	T_{rr} (nS)	Lifetime (nS)	Configuration	Package
HPND-4005	0.017	4.7	120	n/a	100	Single	Beam Lead
HPND-4028	0.045	2.3	60	3	36	Single	Beam Lead

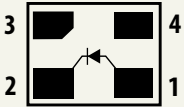
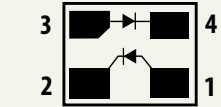
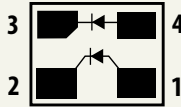
Component	Part Number	Freq. Range (MHz)	IIP3 (dBm)	IP1dB (dBm)	Dynamic Range (dB)	IL (dB)	VSWR (dB)	Package (mm)
50MHz – 4GHz PIN Diode Variable Attenuator Module	ALM-38140	50 - 1000	50	28.8	38	2.8	1.4	3.8x3.8x1.0 MCOB
		1000 - 2000	48.9	35.6	36	3.2	1.4	

Component	Part Number	Freq. Range (MHz)	IIP3 (dBm)	IP1dB (dBm)	ISO (dB)	IL (dB)	RL (dB)	Package
PIN Diode Diversity Switch	HSMP-386D	900	56.8	47.4	25.4	0.35	27.0	SOT-143
	HSMP-389D	900	55.4	46.3	25.7	0.36	28.0	

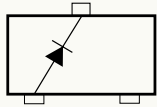
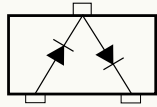
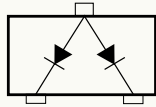
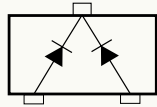
Component	Part Number	Freq. Range (MHz)	OP1dB (dBm)	IL (dB)	RL (dB)	Package
Schottky Assisted PIN Diode Low Power Limiter	ASML-5822	900	2.85	0.85	10.9	SOT-323
	ASML-5829	900	6.05	0.33	15.6	

Diodes — Schottky Diode

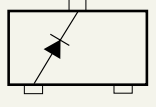
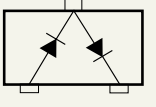
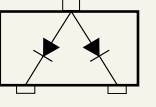
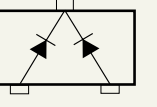
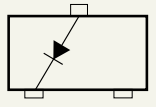
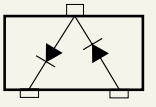
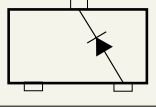
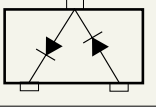
MiniPak

	Single	Anti-parallel	Parallel
Configuration	 <p>(0)</p>	 <p>(2)</p>	 <p>(5)</p>
Schottky	HMPS-2820	HMPS-2822	HMPS-2825

3 Lead Diodes SOT-323 (SC-70)

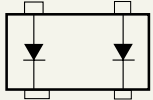
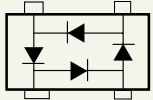
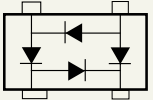
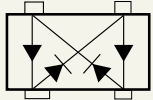
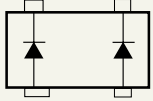
	Single	Series Pair	Common Anode	Common Cathode
Configuration				
Schottky	HSMS-270B	HSMS-270C		
	HSMS-280B	HSMS-280C	HSMS-280E	HSMS-280F
	HSMS-281B	HSMS-281C	HSMS-281E	HSMS-281F
	HSMS-282B	HSMS-282C	HSMS-282E	HSMS-282F
	HSMS-285B	HSMS-285C		
	HSMS-286B	HSMS-286C	HSMS-286E	HSMS-286F

3 Lead Diodes SOT-23

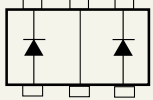
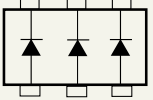
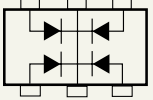
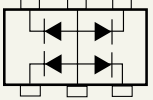
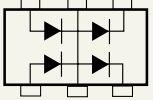
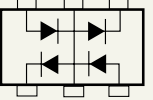
	Single	Series Pair	Common Anode	Common Cathode
Configuration				
Schottky	HSMS-2700	HSMS-2702		
	HSMS-2800	HSMS-2802	HSMS-2803	HSMS-2804
	HSMS-2810	HSMS-2812	HSMS-2813	HSMS-2814
	HSMS-2820	HSMS-2822	HSMS-2823	HSMS-2824
	HSMS-2860	HSMS-2862	HSMS-2863	HSMS-2864
				
	HSMS-2850	HSMS-2852		
				
	HSMS-8101	HSMS-8202		

Diodes — Schottky Diode

4 Lead Diodes SOT-143

	Unconnected Pair	Ring Quad	Bridge Quad	Crossover Quad
Configuration				
Schottky	HSMS-2805		HSMS-2808	
	HSMS-2815	HSMS-2817	HSMS-2818	
	HSMS-2825	HSMS-2827	HSMS-2828	HSMS-2829
	HSMS-2865			
		HSMS-8207		HSMS-8209
				
	HSMS-2855			

6 Lead Diodes SOT-363 (SC-70)

	High Isolation Unconnected Pair	Unconnected Trio	Common Cathode Quad	Common Anode Quad	Bridge Quad	Ring Quad
Configuration						
Schottky	HSMS-280K	HSMS-280L	HSMS-280M	HSMS-280N	HSMS-280P	HSMS-280R
	HSMS-281K	HSMS-281L				
	HSMS-282K	HSMS-282L	HSMS-282M	HSMS-282N	HSMS-282P	HSMS-282R
		HSMS-285L			HSMS-285P	
	HSMS-286K	HSMS-286L			HSMS-286P	HSMS-286R

Diodes — Schottky Diode

Schottky-Barrier Diodes

Application	Part Number	V_{BR} (V) (min)	V_F (mV) (max) IF = 1 mA	$V_F @ I_F$ (V @ mA) (max)	C_i (pF) (typ)	R_o (Ω) (typ)	Volt. Sens. (Y) (mV/mW)			R_v (K Ω) (typ)
							900 MHz	2.45 GHz	5.8 GHz	
General Purpose Detector	HMPS/HSMS-282x	15	340	0.7 @ 30	1.0	12.0	–	–	–	–
High Current Clipping/ Clamping	HSMS-270x	15	–	550 @ 100	6.7	0.65	–	–	–	–
Lowest flicker noise	HSMS-281x	20	400	1.0 @ 35	1.2	15.0	–	–	–	–
High V_{BR}	HSMS-280x	70	400	1.0 @ 35	2.0	35	–	–	–	–
Zero bias detector	HSMS-285x	–	250	0.15 @ 0.1	0.3	–	40	30	22	8
High frequency up to 14 GHz	HSMS-286x	4	350	0.25 @ 0.1	0.3	–	50	35	25	5
Mixer	HSMS-8x0x	4	350	0.25 @ 0.1	0.26	11.0	–	35	25	5

Beam Lead Schottky Diodes

Part Number	V_{BR} (V)	V_F (mV)	C_i (pF)	R_o (Ω)	Configuration	Package
HSCH-5310	4	500	0.1	20.0	Medium Barrier	Beam-Lead
HSCH-5312	4	500	0.15	16.0	Medium Barrier	Beam-Lead
HSCH-5314	4	500	0.15	16.0	Medium Barrier	Beam-Lead
HSCH-5330	4	375	0.1	20.0	Low Barrier	Beam-Lead
HSCH-5332	4	375	0.15	16.0	Series Pair	Beam-Lead
HSCH-5340	4	375	0.1	20.0	Low Barrier	Beam-Lead

Millimeter Wave MMICs Selection Guide

	Frequency Bands / GHz															
	<6	6	7	8	10	11	13	15	18	20	23	26	28	32	38	>38
Power Amplifiers																
AMMP-6408																
AMMC-6408																
AMMP-6421																
AMMC-6425																
AMMC-6440																
AMMP-6441																
AMMC-6442																
AMMP-6442																
AMGP-6432																
AMGP-6434																
Driver/Buffer Amps																
AMMP-5618																
AMMC-5618																
AMMP-5620																
AMMC-5620																
AMMC-6333																
AMMP-6333																
AMMC-5040																
AMMC-6345																
Low Noise Amplifiers																
AMMP-6220																
AMMC-6220																
AMMP-6222																
AMMC-6222																
AMMC/AMMP-6232																
AMMP-6233																
AMMC-6241																
VMMK-1218																
VMMK-1225																
Travelling Wave Amplifiers																
AMMP-5024																
AMMC-5024																
AMMC-5026																
AMMC-5025																

Millimeter Wave MMICs Selection Guide

	Frequency Bands / GHz															
	<6	6	7	8	10	11	13	15	18	20	23	26	28	32	38	>38
Attenuators																
AMMC-6630																
AMMP-6630																
AMMC-6640																
AMMP-6640																
AMMC-6650																
AMMP-6650																
Mixers																
AMMP-6530 IRM																
AMMC-6530 IRM																
AMMP-6522																
AMMC-6522																
AMMP-6545 Sub Harmonic																
AMMC-6545 Sub Harmonic																
AMMP-6546 Sub Harmonic																
AMMP-6548 Sub Harmonic																
Doublers																
AMMP-6120																
AMMC-6120																
AMMP-6125																
AMMC-6140																
Multipliers																
AMMC-5040																
Switches																
AMMC-2008 SPDT																

Millimeter Wave MMICs Selection Guide

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs MMIC Low Noise Amplifier	AMMC-5024	30Khz - 40	4V @ 160	3.7	17.5	17.3	22.5	Chip
	AMMC-5026	2 - 35	7V @ 150	3.6	10.0	+24	31	Chip
	AMMC-6220	6 - 20	3V @ 55	1.8	23.0	9	19	Chip
	AMMC-6222	7-21	4V @ 120	2.4	25.0	16	29	Chip
	AMMC-6232	18 - 32	4V @ 135	2.8	27.0	18	29	Chip
	AMMC-6241	26 - 43	3V @ 60	2.7	20.0	10	20	Chip
	AMMP-6220	6 - 20	3V @ 55	1.9	23.0	10	21	SM 5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	15.5	29	SM 5x5
	AMMP-6232	18 - 32	4V @ 138	3.0	23	18	29	SM 5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	8	19	SM 5x5
	VMMK-1218	0.5 - 18	3/20	0.7	10.7	12	12	SM 1x0.5
	VMMK-1225	0.5 - 26	2/20	0.9	11	8	23	SM 1x0.5
GaAs MMIC Broadband Medium Power Amplifiers	AMMC-5025	30Khz - 80	5V @ 100	–	8	15	20	Chip
	AMMC-5040	20 - 45	4.5V @ 300	8	24	22	23	Chip
	AMMC-5618	6 - 20	5V @ 107	4.4	14.5	+19.5	26	Chip
	AMMC-5620	6 - 20	5V @ 95	4.2	19	+15	23.5	Chip
	AMMC-6333	18 - 33	5V@230mA	5	20	23	30	Chip
	AMMC-6345	20 - 45	5V @ 480	9.0	20.0	24	32	Chip
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19.5	30	SM 5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	15	22.5	SM 5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	SMT 5X5

Component	Part Number	Freq. Range (GHz)	Biasing Condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
GaAs MMIC Power Amplifiers	AMMC-6408	6 - 18	5V@650mA	4.3	19	29	38	Chip
	AMMP-6408	6 - 18	5V @ 650	4.5	18.0	28	38	SM 5x5
	AMMC-6425	18 - 28	5V @ 900 mA	9	20	28	38	Chip
	AMMC-6431	25 - 33	5V @ 650 mA	8.5	19	28.5	37	Chip
	AMMC-6442	37 - 40	5V @ 700 mA	7.5	23	30	36.5	Chip
	AMMP-6442	37 - 40	5V @ 700 mA	8	23	30	36	SM 5x5
	AMGP-6432	28 - 31	6V @ 700 mA	–	20	33	40 @ 30 GHz	SM 5x5
	AMGP-6434	28 - 31	6V @ 1400 mA	–	20	35.5	42 @ 30 GHz	SM 5x5

Millimeter Wave MMICs Selection Guide

Component	Part Number	Freq. Range (GHz)	In/Output RL (dB)	Control Range (dB)	Min. IL (dB)	Control Voltage (V)	IIP3 (dBm)	Package (mm)
GaAs MMIC Variable Attenuators	AMMC-6630	5 - 45	10/10	20	3.5 @ 25 GHz	0 to +1V	+23 @ 25 GHz	Chip
	AMMC-6640	DC - 50	12/12	20	4 @ 50 GHz	0 to +1.2V	+27 @ 10dB/30 GHz	Chip
	AMMC-6650	DC - 40	15/15	22	3.1 @ 40 GHz	0 to +1.5V	+7 @ 22 GHz	Chip
	AMMP-6630	5 - 30	10/10	20	3.5 @ 25 GHz	0 to +1V	+23 @ 25 GHz	SM 5x5
	AMMP-6640	DC-40	10/10	20	4.4 @ 30 GHz	0 to +1.2V	+27 @ 10dB/30 GHz	SM 5x5
	AMMP-6650	DC-30	12/12	22	2.1 @ 30 GHz	0 to +1.5V	+7 @ 22 GHz	SM 5x5

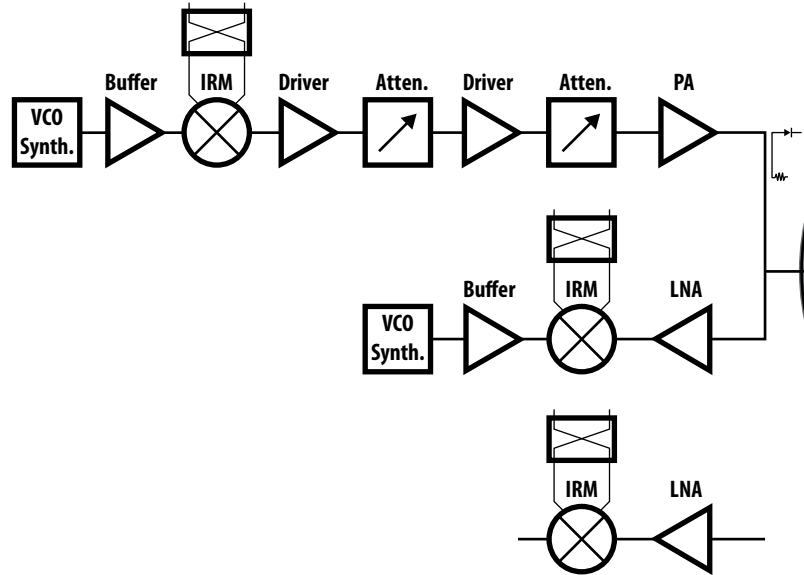
Component	Part Number	Freq. Range (GHz)	Insertion Loss (dBm)	Isolation (dB)	Input P1dB (dBm)	Control Input (Vdc)	Package
GaAs MMIC SPDT Switch	AMMC-2008	DC - 50	2.3	25	14	0 / -5	Chip

Component	Part Number	RF Freq. (GHz)	IF Freq. (GHz)	Conversion Gain (dB)	LO/RF Iso (dB)	IIP3 (dBm)	Image Reject (dB)	Package (mm)
GaAs MMIC Mixers/Converter	AMMC-6530	5 - 30	DC - 5	-10	22	18	15	Chip
	AMMP-6522	7 - 20	DC - 3.5	13		-4	15	SM 5x5
	AMMP-6530	5 - 30	DC - 5	-8	22	18	15	SM 5x5
	AMMP-6545	18 - 45	DC - 3.5	-11	30	11	-	SM 5x5
	AMMP-6522	7 - 20	DC - 3.5	-13	-	-2 @ 16 GHz	15	SM 5x5
	AMMP-6530	5 - 30	DC - 5	-5 @ 20 GHz	25	24 @ 23 GHz	15	SM 5x5
	AMMP-6532	20 - 32	1 - 5	-13	-	-2 @ 26 GHz	15	SM 5x5
	AMMP-6545	18 - 40	DC - 3.5	-11 @ 36GHz	30	12	-	SM 5x5
	AMMP-6546	18 - 40	DC - 3.5	-11 @ 35GHz	30	16 @ 30 GHz	-	SM 5x5
	AMMC-6530	5 - 30	DC - 5	-5 @ 20 GHz	25	24 @ 23 GHz	15	Chip
	AMMC-6545	18 - 45	DC - 3.5	-9 @ 30GHz	33	18	-	Chip

Component	Part Number	Input Freq. (GHz)	Output Freq. (GHz)	IP1dB (dBm)	Pout (dBm)	Fo (dBc)	3Fo (dBc)	Package (mm)
GaAs MMIC Doublers	AMMC-6120	4 - 12	8 - 24	2.0	15	25	25	Chip
	AMMC-6140	10 - 20	20 - 40	5.0	-1	30	25	Chip
	AMMP-6130	15	30	3.0	21	60	50	SM 5x5
	AMMP-6120	4 - 12	8 - 24	2.0	15	25	25	SM 5x5
	AMMP-6125	5 - 12	10 - 24	0	22	20	20	SM 5x5

Microwave Radio Link Application Circuit

Microwave Link Packaged Suggested Solution 7-8 GHz

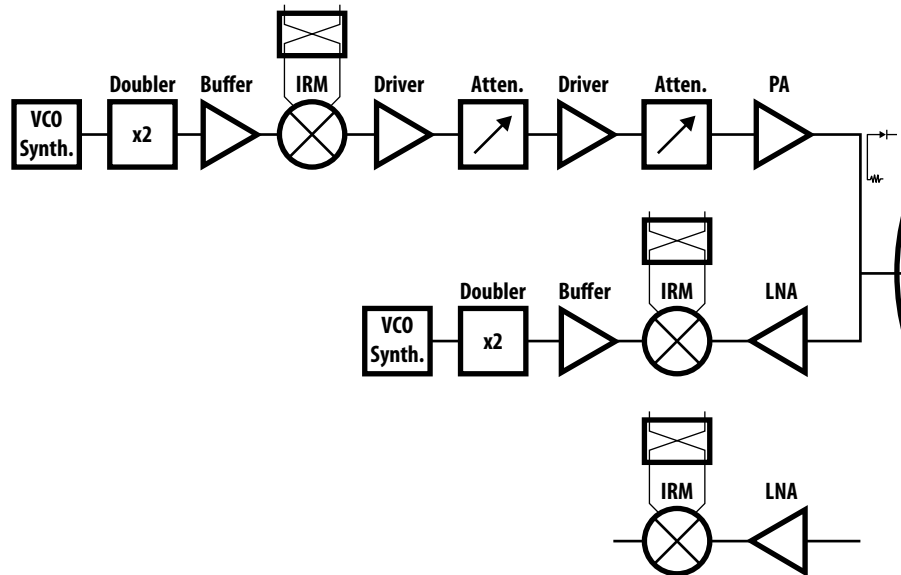


Microwave Link Packaged Suggested Solution 7-8 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	+15.5	–	5x5
	VMMK-3213	6 - 18	1.5V@0.15	–	–	–	–	1x0.5x0.25

Microwave Radio Link Application Circuit

Microwave Link Packaged Suggested Solution 10-18 GHz



Microwave Link Packaged Suggested Solution 10-11 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6120	8 - 24	5V @ 112	–	–	–	–	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	–	–	–	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	–	5x5
	VMMK-3213	6 - 18	1.5V@0.15	–	–	–	–	1x0.5x0.25

Microwave Link Packaged Suggested Solution 13-15 GHz

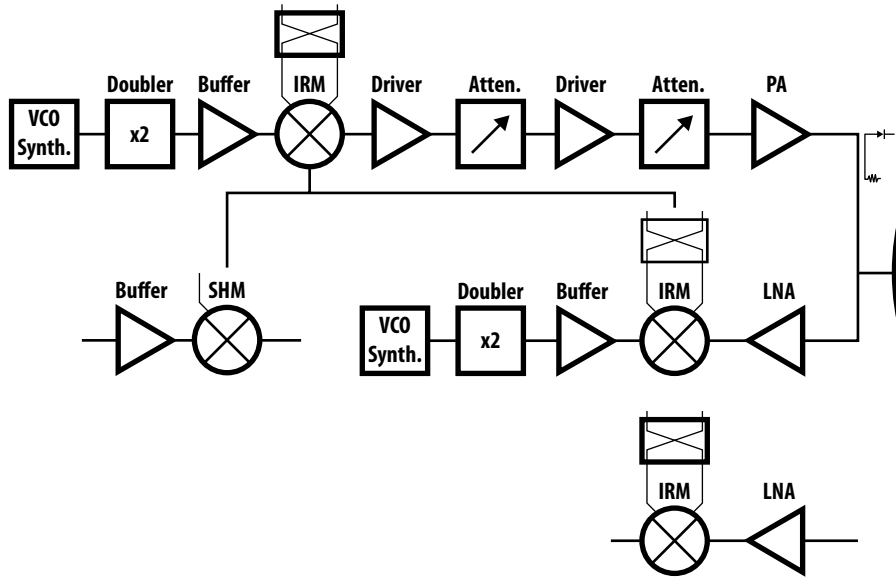
Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6120	8 - 24	5V @ 112	–	–	–	–	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	–	–	–	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	–	5x5
	VMMK-3213	6 - 18	1.5V@0.15	–	–	–	–	1x0.5x0.25

Microwave Link Packaged Suggested Solution 18 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6120	8 - 24	5V @ 112	–	–	–	–	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	–	–	–	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @120	2.3	24	+15.5	–	5x5
	AMMP-6232	18 - 32	4V @135	3.0	23	+18.0	–	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	–	5x5
	VMMK-3313	15 - 33	1.5V@0.15	–	–	–	–	1x0.5x0.25

Microwave Radio Link Application Circuit

Microwave Link Packaged Suggested Solution 23-26 GHz



Microwave Link Packaged Suggested Solution 23 GHz

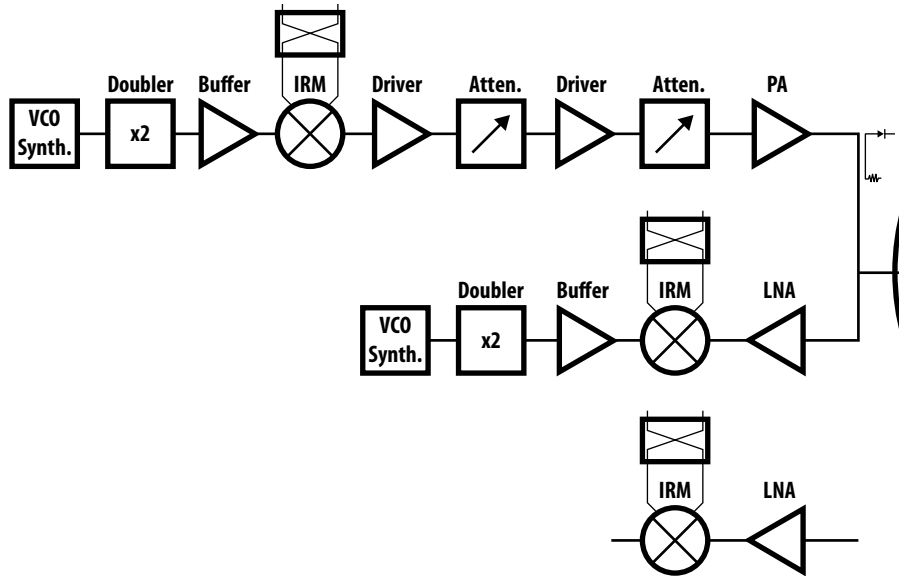
Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6120	8 - 24	5V @ 112	–	–	–	–	5x5
	AMMP-6125	10 - 24	3.5V/5V @ 260	–	–	–	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	+15.5	–	5x5
	AMMP-6232	18 - 32	4V @ 135	3.0	23	+18.0	–	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	–	5x5
	AMMP-6333	18 - 33	5V @ 230mA	5.5	20	23	30	5x5
	VMMK-3313	15 - 33	1.5V @ 0.15	–	–	–	–	1x0.5x0.25

Microwave Link Packaged Suggested Solution 26 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	+15.5	–	5x5
	AMMP-6232	18 - 32	4V @ 135	3.0	23	+18.0	–	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	–	5x5
	AMMP-6333	18 - 33	5V @ 230mA	5.5	20	23	30	5x5
	VMMK-3313	15 - 33	1.5V @ 0.15	–	–	–	–	1x0.5x0.25

Microwave Radio Link Application Circuit

Microwave Link Packaged Suggested Solution 28-32 GHz



Microwave Link Packaged Suggested Solution 28 GHz

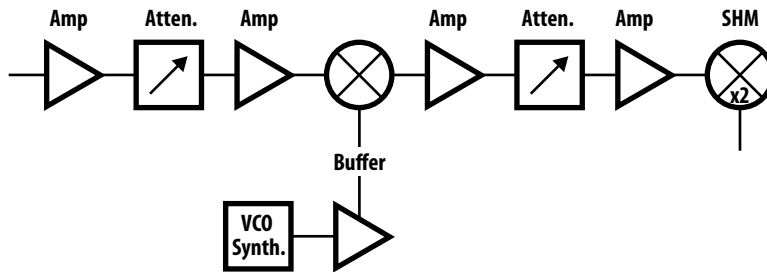
Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	+15.5	–	5x5
	AMMP-6232	18 - 32	4V @ 135	3.0	23	+18.0	–	5x5
	AMMP-6425	18 - 28	5V @ 650	–	22	+28.0	–	5X5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	–	5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	5X5
	VMMK-3313	15 - 33	1.5V@0.15	–	–	–	–	1x0.5x0.25

Microwave Link Packaged Suggested Solution 32 GHz

Component	Part Number	Freq. Range (GHz)	Bias condition (V @ mA)	NF (dB)	Gain (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
	AMMP-5618	6 - 20	5V @ 107	4.4	14.5	+19	–	5x5
	AMMP-5620	6 - 20	5V @ 95	5.1	17.5	+15	–	5x5
	AMMP-6220	6 - 20	3V @ 55	2.5	22	+10.0	–	5x5
	AMMP-6222	7 - 21	4V @ 120	2.3	24	+15.5	–	5x5
	AMMP-6232	18 - 32	4V @ 135	3.0	23	+18.0	–	5x5
	AMMP-6233	18 - 32	3V @ 65	2.6	23	+8.0	–	5x5
	AMMP-6333	18 - 33	5V@230mA	5.5	20	23	30	5X5
	VMMK-3413	25 - 45	1.5V@0.15	–	–	–	–	1x0.5x0.25

Microwave Radio Link Application Circuit

IF 1st and 2nd Stage Radio Link Suggested Solution



IF 1st and 2nd Stage Radio Link Suggested Solution

Part Number	Freq. Range (GHz)	Test Freq. (GHz)	Vd (V)	Id (mA)	Gain (dB)	NF (dB)	P1dB (dBm)	OIP3 (dBm)	Package (mm)
ABA-53563	DC - 3.5	2	5	46	21.5	3.5	12.7	22.9	SOT-363 (SC70)
ABA-54563	DC - 3	2	5	79	23	4.4	16.1	27.8	SOT-363 (SC70)
ADA-4789	DC - 2.5	0.9	3.8	60	16.5	4.2	17.1	32.6	SOT-89
ATF-54143	0.45 - 6	2	3	60	16.6	0.5	20.4	36	SOT-363 (SC70)
ATF-541M4	0.45 - 10	2	3	60	17.5	0.5	21.4	36	MiniPak Package
AVT-50663	DC-6000	2	5	36	15.3	4	12.5	25	SOT-363 (SC70)
AVT-52663	DC-6000	2	5	45	15.3	4	12.7	27	SOT-363 (SC70)
AVT-53663	DC-6000	2	5	48	19.5	3.2	15.1	26.5	SOT-363 (SC70)
MGA-30489	0.25 - 3.0	1.9	5	97	13.3	3	-	39	SOT-89
MGA-30689	0.04 - 2.6	1.95	5	104	14.6	3.3	-	40	SOT-89
MGA-30889	0.04 - 2.6	0.9	5	65	15.5	-	-	38	SMT 4.5x4.1x1.5
MGA-565P8	0.1 - 3	2	5	67	21.8	-	-	-	LPCC2x2
MGA-62563	0.1 - 3	0.5	3	60	22	0.9	17.8	32.9	SOT-363 (SC70)
VMMK-2403	1.5 - 4.0	3	3	38	15	1.8	16.5	29	1x0.5x0.25
VMMK-2503	1.0 - 1.2	6	5	65	14	3.3	17	27	1x0.5x0.25

IF 1st and 2nd Stage Radio Link Suggested Solution

Part Number	Freq. Range (GHz)	IIP3 (dBm)	IP1dB (dBm)	Dynamic Range (dB)	IL (dB)	VSWR (dB)	Package (mm)
ALM-38140	50 - 1000	50	28.8	38	2.8	1.4	3.8x3.8x1.0 MCOB
	1000 - 2000	48.9	35.6	36	3.2	1.4	

Part Number	Freq. Range (GHz)	Test Freq. (GHz)	IIP3 (dBm)	Attenuation (dB)	Insertion Loss (dB)	Return Loss (dB)	Package (mm)
HSMP-3816	0.3 - 4	1	45	38	-3	-22	SOT - 25
HSMP-3866	0.3 - 4	1	30	36	-2.5	-18	SOT - 25

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